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MAY 11, 1933.

FIRST AERO WEEKLY IN THE WORLD

MAY 22 1933

FLIGHT

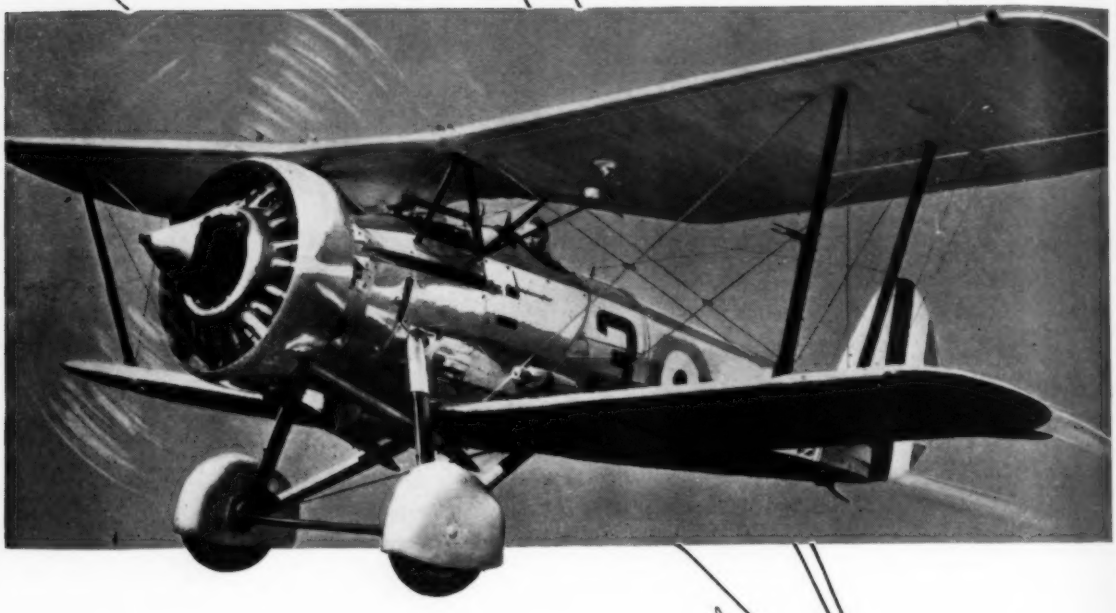
The AIRCRAFT ENGINEER AND AIRSHIPS

OFFICIAL ORGAN OF THE ROYAL AERO CLUB

SIXPENCE
EVERY THURSDAY

No. 1272
Vol. XXV
No. 19

RELIABILITY IN SERVICE



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FLIGHT

The AIRCRAFT ENGINEER AND AIRSHIPS

First Aeronautical Weekly in the World. Founded January, 1909

Founder and Editor: STANLEY SPOONER

A Journal devoted to the Interests, Practice and Progress of Aerial Locomotion and Transport

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DIARY OF CURRENT AND FORTHCOMING EVENTS

Club Secretaries and others desirous of announcing the dates of important fixtures are invited to send particulars for inclusion in this list:—

1933.
May 13. No. 2 Sqdn. R.A.F. Reunion Dinner, Park Lane Hotel.
May 16. Junior Ae.C. Dinner to Sqdn. Ldr. Gayford and Flt. Lt. Nicholetts.
May 16-22. International Rally, Vienna.
May 19. Entries close at ordinary fee for King's Cup Race.
May 20. G.A.P.A.N. Annual Civil Air Display, Brooklands.
May 20-22. Scottish Flying Club Annual Display, Renfrew.
May 25. Opening of Royal Tournament, Olympia.
May 25. Tourist Rally at Wiesbaden.
May 27. Reading Ae.C. Annual "At Home."
May 28. Deutsch de la Meurthe Cup, Etampes.
May 29. Opening of R.A.F. Rifle Association's Meeting at Bisley.
May 30. Wilbur Wright Memorial Lecture before R.Ae.S.
May 31. Entries close at double fee for King's Cup Race.
June 4. Skegness Flying Meeting.
June 5. "Morning Post" Race, Heston.
June 5. Lincs. Ae.C. Air Pageant and Opening of Aerodrome at Holton-le-Clay, Grimsby.
June 5. Northamptonshire Ae.C. Annual Air Pageant.
June 7. Household Brigade Flying Club Meeting.
June 10. Henly's Rally, Heston.
June 10. Close of Royal Tournament, Olympia.
June 11. International Meeting, Brussels.
June 15-18. Aero Club of France Tourist 'Plane Meeting.
June 16. Mayor's Aerial Garden Party, Eastbourne.
June 16-17. Opening of Inverness Municipal Airport.
June 17. Bristol Airport Flying Meeting.
June 17. Charity Air Display at Maidstone Airport.
June 20. Princess Mary's R.A.F. Nursing Services Afternoon Reception, Claridge's.
June 21. Official Opening of Norwich Municipal Airport by H.R.H. the Prince of Wales.
June 23. Cinque Ports Club Flying Meeting.
June 24. Royal Air Force Display, Hendon.
July 8. King's Cup Air Race, Hatfield.

EDITORIAL COMMENT

CYNICS are fond of saying that in spite of the vast store of aerodynamic data available, little real progress has been made in the aerodynamic design of aeroplanes. While there is considerable truth in that contention, all the extra performance obtained from modern aeroplanes is not due to the excellent engines which are now at the disposal of the aeroplane designer. Some improvement *has* been achieved in aerodynamic fineness, although the greatest progress has probably been made in the direction of controllability. But few would deny that we have still a long way to go, not only in the matter of speed range but also in such "practical" desiderata as comfort and safety.

Interesting Developments

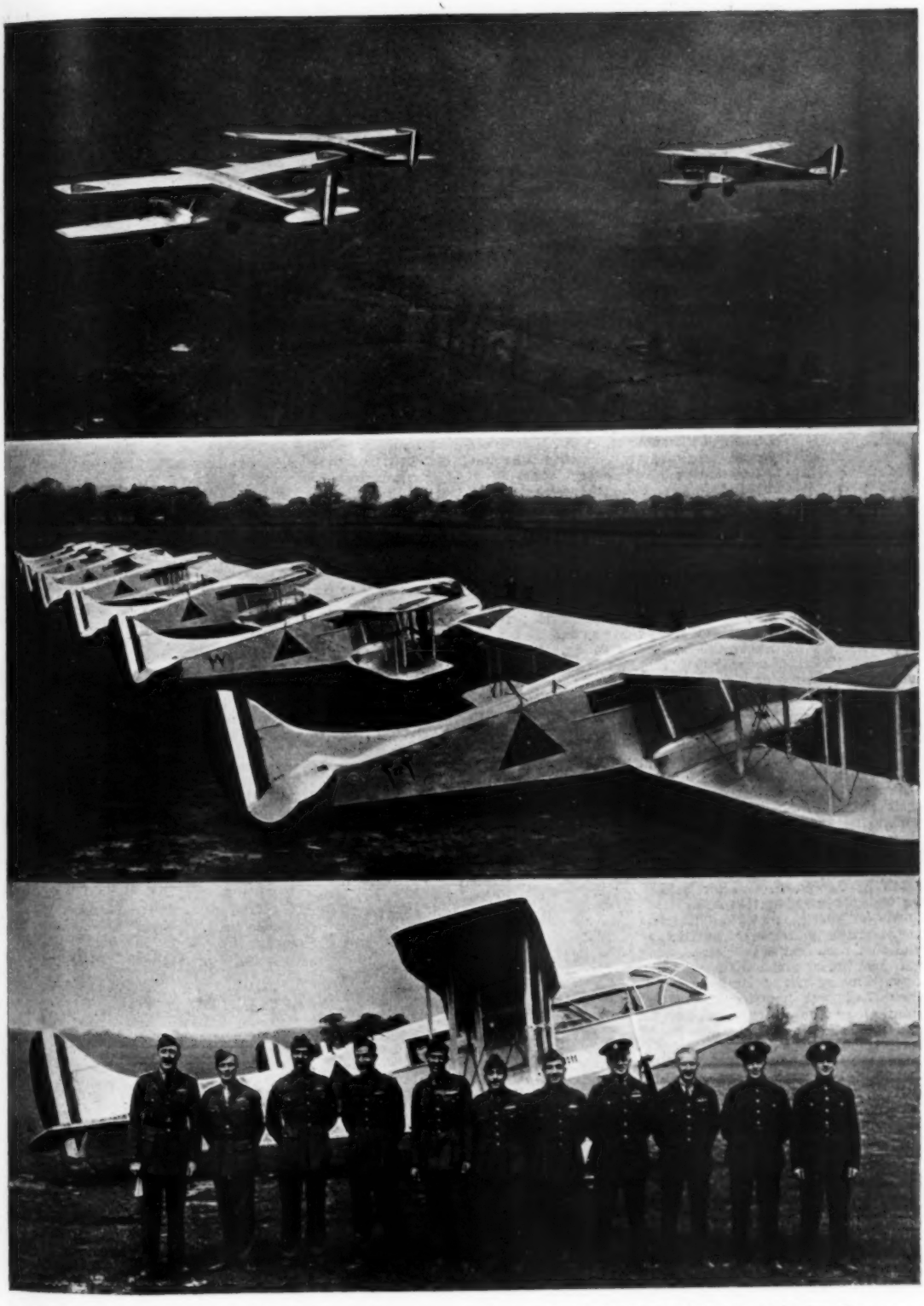
The serious student of aviation may have felt that during the last few years we have tended to get into a rut, and that each new aircraft produced was very much like those which preceded it. A certain amount of impatience was understandable, although in flying, as in most other activities, it usually pays to make haste slowly. Recently one may discern a marked tendency towards serious efforts to break away from the stereotyped, and to make practical use of the results of intensive research in the establishments of all the larger countries in the world. New ideas are being tried out, and old ideas are being revived in modified form. Now, for the first time in the history of flying, the aeroplane designer is given full scope in that the range of available engines of proved reliability is now very wide. When there was a very good chance of engine trouble, the designer had to plan with that possibility well in mind. Now engines are so reliable that complete engine failure is, if not unheard of, at least a very rare occurrence. Consequently one very real anxiety is removed from the shoulders of the aircraft designer. How is he reacting to the new state of affairs? If one looks around the world of aviation, it is found that in several countries abroad he is using the excellent reliability of aero engines as an excuse to employ excessive wing loadings, because the possibility of a hurried forced

landing on unsuitable ground is rather remote. While the cutting down of wing area does give an improvement in top speed and cruising speed, it cannot be said that the aircraft designer has really achieved serious aerodynamic advance. All he has done is to take the fullest advantage of the work of his " opposite number," the aero-engine designer. We are very glad that British designers have steadily refused to adopt this line of least resistance, and have preferred to be content with lower top speeds in order to retain a reasonable landing speed. The logical line of development must be one of greater speed range, and of serious endeavours to achieve this we have lately such examples as the fully slotted and flapped wing, as on the Heinkel He. 64, and the latest Autogiro produced by Mr. de la Cierva. The former machine has a speed range of about 4 to 1, and the latter has achieved a value as high as about 5 to 1. Both combine with this wide speed range an absence of the stalling danger, as does also the " Pterodactyl." To us it seems that the greatest practical advantage of the ability to fly slowly is not the landing, although that is obviously very important, but the fact that if a pilot happens to get into bad weather with poor visibility, he can, with his reliable engine, fly along slowly while looking for a place to land. In thick weather the ability to do this is a very real safety measure.

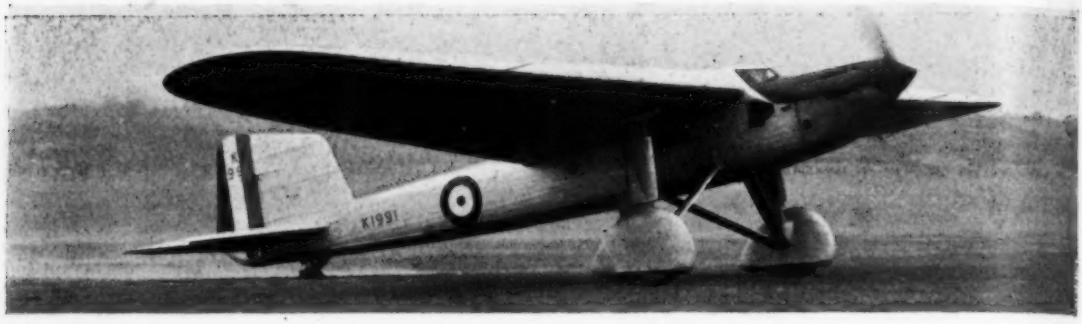
In the modern " cleaned-up " aeroplane the air brake has become much more important than in the past, and it is good to find that more and more designers, at home and abroad, are turning their attentions to the development of effective types. They may be struts turned " broadside on," as in the " Puss Moth," they may be flaps in the fuselage floor, as in the Percival " Gull," or they may be split trailing-edge flaps, as in several recent American machines. At any rate, really serious efforts are being made to provide means for making the glide steeper without the pilot having to resort to sideslip landings.

To increase the pilot's view and the comfort of him and his passenger, the little pusher designed by Messrs. Shackleton and Lee Murray has been produced recently. Here is at least one type in which the good qualities of the pre-war pushers have been secured without sacrificing aerodynamic efficiency to any marked extent. In fact, the SM 1 pusher of 1933 has a better top speed than had the tractors of comparable power in 1913-14. In fact, we are progressing all along the line, and 1933 promises some very interesting developments.

ITALY PAYS HOMAGE TO HINKLER : The body of Sqd. Ldr. Bert Hinkler was temporarily interred in a crypt in the Protestant cemetery of Degli Allori, Florence, on May 1. The Royal Italian Air Force accorded full military honours to the great British pilot, and in this photograph a guard of honour of the Royal Italian Air Force heads the funeral cortège on its way through Florence. The sympathy of the Italian population is indicated by the number lining the streets.



D.H. "DRAGONS" FOR IRAQ: Eight military type "Dragons" (2 "Gipsy Majors") left for Iraq on May 5, and will be used to supplement the D.H. "Moths" already in service in the Iraqi Air Force (see page 445). (FLIGHT *Photos.*)



ON ENGLISH SOIL ONCE MORE : The Fairey long-range monoplane (Napier engine) taxying in on its arrival at Farnborough on May 2. (FLIGHT *Photo.*)

Return of the Record-Breakers

THE Fairey (Napier) long-range monoplane, piloted by Sqd. Ldr. O. R. Gayford, D.F.C., A.F.C., and Flt. Lt. G. E. Nicholetts, A.F.C., returned from its record breaking trip across Africa and landed at South Farnborough on Tuesday, May 2, at 12.35 p.m. The night before had been spent in Paris. The two officers were greeted on their return by Lord Londonderry, Secretary of State for Air (who was accompanied by his young daughter, Lady Mary Stewart) ; Sir Philip Sassoon, Under Secretary ; Marshal of the Royal Air Force Sir John Salmond, still acting as Chief of the Air Staff ; Air Marshal Sir Robert Brooke-Popham, Commanding-in-Chief Air Defence of Great Britain ; Air Marshal Dowding, Air Member for Supply and Research ; representatives of the Fairey and Napier firms, and a number of others. Another record-breaker, Flt. Lt. Stainforth, was also there. The edges of the aerodrome were lined with a very considerable crowd.

After the officers had "de-planed" and been duly greeted and photographed, to which they submitted with a grim die-in-the-last-ditch expression, which aroused the pity of all except the ruthless photographers, they were taken off to lunch in the Mess, and after that they gave some account of their doings. Somewhat to the general surprise, they denied that they had met unusually bad weather on the record flight, and had been prevented by it from reaching Capetown. They said on the contrary that, thanks to good judgment, they had been very fortunate in their weather, and that they had not expected to get any further south than Walvis Bay. During the waiting period they had got weather reports from along the route each day, and they had worked out how far their 1,150 gallons of petrol would have taken them on each day. On an average the answer was Walvis Bay. On some days they would not have been able to break the record, and on others they would have got a little further south, but it nearly always worked out to reaching Walvis Bay. When they got there they had 14 gallons of petrol left. Counting that, they would have required 125 more gallons to take them on to Capetown. The Fairey monoplane had, in fact, done all that it had been asked to do.

Their chief impression of the flight was the remarkable performance of the Napier engine, which had run excellently throughout and had given them no anxiety. All the instruments had stood up well, except the windscreen wipers, which parted company with the machine at a very early stage of the flight. It may be remembered that when the late Sqd. Ldr. Jones-Williams flew non-stop to Karachi, he found the windscreen wipers very useful in the bad weather which was encountered.

Sqd. Ldr. Gayford said that the automatic pilot justified itself. It did not strike work until after they had passed Duala. The trouble was mechanical, and the cause had not yet been quite ascertained—it would probably be found out at Farnborough. They did not leave this device altogether to itself, but kept constantly checking its course ; but it was very useful because it flew a more accurate course than a human pilot could do. They did not find its corrections too violent.

On the flight to Walvis Bay the machine actually covered 5,450 miles, the great circle course being 5,309. All the second night they were flying blind across Nigeria, owing to dust haze and clouds. In one wireless message they had made a mistake about their position, and later sent a correction, but this correction was never picked up. Still,

THE OFFICIAL WELCOME : Sqd. Ldr. Gayford is greeted by Marshal of the Royal Air Force, Sir John M. Salmond. On the left is the Marquess of Londonderry, Secretary of State for Air. In the foreground, with her back to the camera, is Sqd. Ldr. Gayford's mother, who was justly proud of her son's achievement. (FLIGHT *Photo.*)

MORE FORMAL: Flt. Lt. Nicholetts, Lord Londonderry, Sqd. Ldr. Gayford, and Marshal of the R.A.F., Sir John Salmond, under the wing of the Fairey long-range monoplane. (FLIGHT *Photo.*)

the weather in Nigeria might easily have been worse. They neither of them slept at all during the 57½ hours, but they had a shave every morning. On landing they were not unduly tired. They had a bath and a meal, and then slept for 10 hours. Next night they went to a dance. Still, they admitted that they would not have cared to fly on for very much longer. The machine was very noisy. They sat over the engine, and there were no exhaust pipes The original plan had been for the machine to climb gradually for five hours up to 5,000 feet and then fly at that level, but they had to vary that plan according to circumstances. They had no difficulty in crossing the mountains of Sardinia. In the Sudan it would not have been possible to land "practically anywhere," as for 300 miles round the great Ahaggar plateau the desert is very broken. Over the Sahara they used sextant navigation.

Since leaving Walvis Bay they had flown (with a new engine installed at Capetown) 9,200 miles, touring the Union and coming home, and had spent 106 hours in the air. On the next day they were to fly the monoplane up to Cranwell, and then they hoped for a little leave.

The record-breaking monoplane will be on view at the R.A.F. Display at Hendon on June 24.

THE HENDON ACCIDENT

AS a result of a fatal crash at Hendon on the evening of Monday, May 1, P/O. Viscount Knebworth was killed instantly, his passenger, No. 801246 L.AC. Ralph Harrison, who was seriously injured, dying soon after in hospital.

No. 601 County of London Bombing Squadron, to which the two belonged, were practising formation flying, and the crash occurred when the machines were diving in formation. It appears that Viscount Knebworth's machine was on the left of a "V" formation, led by Flt. Lt. Hobson, and at a height of about 500 ft., or just under, the leader started to flatten out for a zoom afterwards. For some inexplicable reason the machines did not pull out quick enough, and Viscount Knebworth's machine hit the ground while travelling at considerable speed, skated along for a few yards, smashing the undercarriage, and then plunging into the ground, bursting into flames. The many lurid details, some of them bordering on the indecent, which have been put before the public, are of little real interest to the normal healthy person, but it may be noted that on the particular afternoon of the crash there was thunder about, which is frequently the cause of very peculiar disturbances in the air, whilst Hendon aerodrome is noted for its bumps at very low altitudes, probably due to the stands, the railway embankment, and the rising ground on its borders. It is most probable that an exceptional combination of these circumstances was more responsible for the accident than a serious error on the part of any individual, although Flt. Lt. Hobson, who has always held a reputation for conscientiousness and care, endeavoured at the inquest to accept blame for the accident. He laid stress on the fact that Knebworth's machine would have to follow his. Flt. Lt. Hobson's very gallant attitude is typical of the man. The machine which crashed was rather a victim of circumstances not experienced by the other machines of the formation, and no one pilot or any other individual was responsible for those circumstances." At the inquest a verdict of misadventure was returned.

Edward Anthony James Lytton, Viscount Knebworth, was the elder son of the Earl and Countess of Lytton. He would have been 30 on the 13th of this month. He was a godson of King Edward VII and was educated at Eton and Oxford. At school he played Rugger and cricket, but at the University he devoted his time to boxing, obtaining a half blue. These were recreations, and as soon as Viscount Knebworth left Oxford he devoted his time to politics and aviation. In 1929 he unsuccessfully contested the seat for Shoreditch, and in 1931 was returned to Parliament for the Hitchin Division of Hertfordshire. He was a pilot officer of the Auxiliary Air Force, being a member of No. 601 County of London Bombing Squadron. Viscount Knebworth was a versatile young man with a vigorous character, for whom a great future had been predicted.

England seems to have lost several young men of great promise in the last year or two, and at a time when she cannot well afford such ill-luck. To the relatives and friends of Lord Knebworth we offer our sincerest sympathies in their bereavement.

King's Cup

THE ROYAL AERO CLUB has received the following entries for the King's Cup Race, to be held on July 8, 1933, starting and finishing at Hatfield aerodrome:—The Hon. Lady M. Bailey, Edgar William Hart, E. L. Gandar Dower, and Mrs. Doris Sale, D.H. "Puss Moths"; Charles G. Grey, Arrow "Active"; Alexander Henshaw, Comper "Swift"; Theodore Cecil Sanders, Martlet; Sir William Morris, Bart., three Hawker "Tomtits"; Lt. Com. E. W. B. Leake, Percival "Gull"; Lt. Col. L. A. Strange, Spartan "Clipper"; Wing Com. H. M. Probyn, "Hawk." Intending competitors are reminded that entries close on May 19, 1933, at 5 p.m.

Luncheon to Long-Distance Airmen

THE President of the Royal Aeronautical Society, Mr. C. R. Fairey; Lord Gorell, Chairman of the Royal Aero Club; Mr. Herbert J. Thomas, Chairman of the Society of British Aircraft Constructors, and General Sir John Seely, Chairman of the Air League of the British Empire, are entertaining Sqd. Ldr. O. R. Gayford, D.F.C., R.A.F., and Flt. Lt. G. E. Nicholetts, A.F.C., R.A.F., to lunch with a number of distinguished guests on their return from their record flight. The lunch (gentlemen only) will be held at the Park Lane Hotel on Thursday, May 18, at 12.45 p.m. for 1 p.m. (Piccadilly entrance). The tickets will be 12s. 6d. each, inclusive of wines, etc.

THE S.M.1

70 h.p. Hirth Engine

FOR sheer pleasure of flying, the old "pusher" of pre-war days has never been beaten. The engine being behind the occupants, the degree of noise which reached them *seemed* insignificant. Whether or not this was a real or an imagined effect one would hesitate to say. Doubtless there could be found people who would prove on paper that the difference cannot be great. The fact remains that, whether it is due to the back of one's head being turned to the engine or whether the volume of noise *is* reduced appreciably by the relative wind blowing from the observer towards the origin of the noise, the old pushers were remarkably quiet. It is true, of course, that they were fitted with engines of fairly low power; 100 h.p. was a powerful engine in those days. But we think most who have flown in the old machines will agree that one was never distressed by the noise. The writer has in mind one very memorable flight in one of the Howard-Wright-designed "Wight" seaplanes, piloted by Mr. Gordon England over the Solent. The view was enchanting, with shipping going up and down the Solent and Southampton Water, and with the shoals on each bank of the Medina clearly visible. The engine noise was scarcely noticeable, and the streamlining of the nose of the little engine *nacelle* was probably fairly poor. At any rate, one could lean out quite a distance without getting one's head into the draught. There was a smooth sea below, and plenty of space, so that if the engine should stop (as they were known to do sometimes in those days), there was nothing to worry about. That flight remains in the memory after 20 years as an outstanding example of what flying *could* be, *should* be, but seldom *is*.

SHACKLETON-LEE MURRAY S.M.1
70-h.p. Hirth Engine

Dimensions

	ft.	in.	m.
Length o.a.	25	7	7,81
Height o.a.	7	6	2,29
Wheel track	6	3	1,90
Wing span	40	0	12,20
Wing span, folded	12	9	3,89
Wing chord	5	4	1,62
Wing area	210 sq. ft. (19,5 m²)		
Wing loading	7·1 lb./sq. ft. (33,8 kg./m²)		
Power loading	20·7 lb./h.p. (9,4 kg./C.V.)		

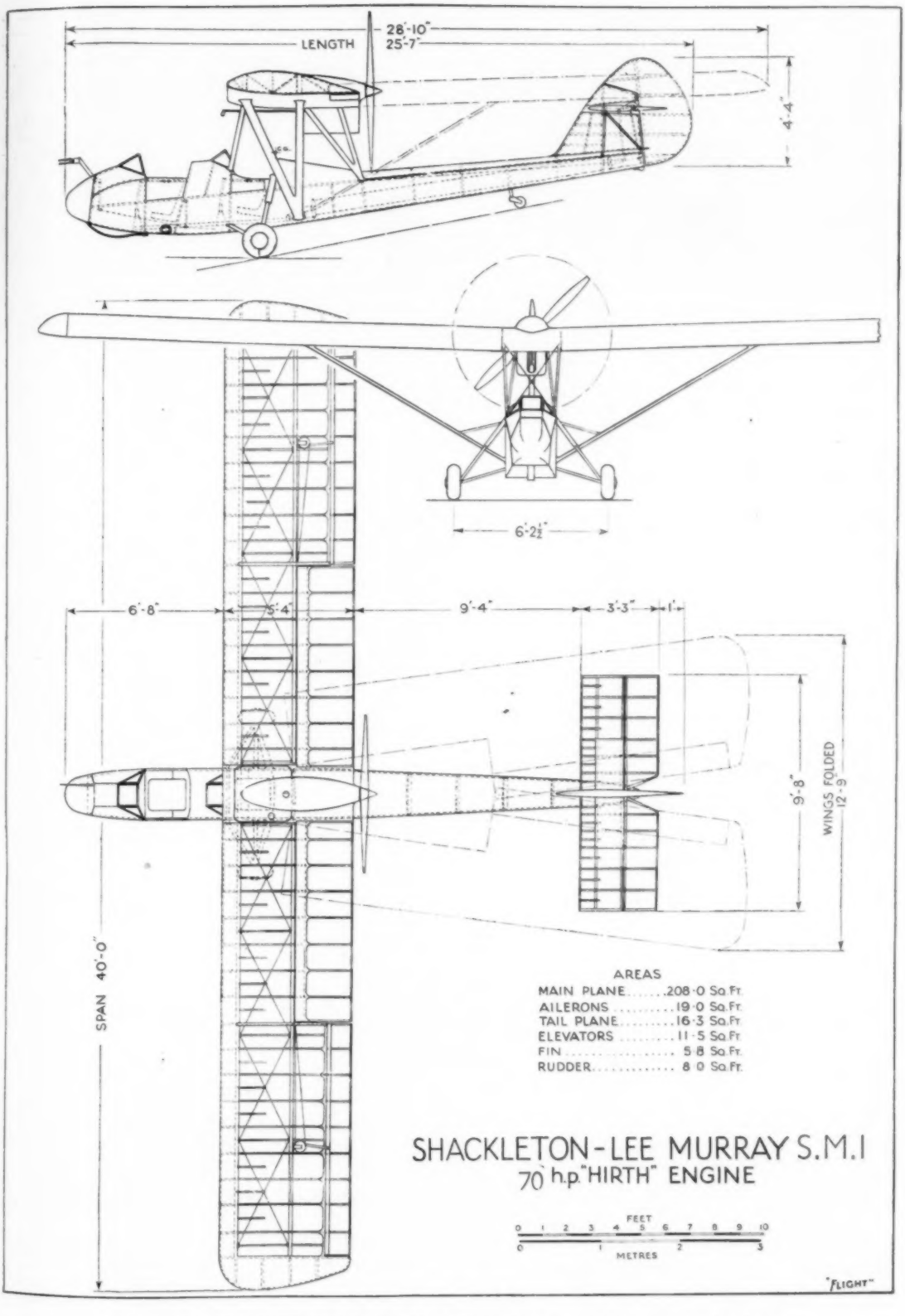
Weights

	lb.	kg.
Tare weight	840	382
Disposable load	610	277
Total loaded weight	1,450	659

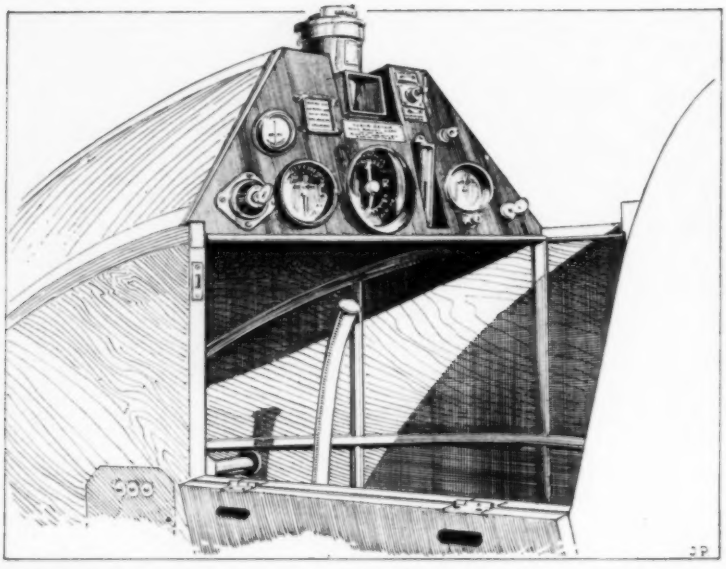
Performance

	m.p.h.	km./h.
Maximum speed	90	145
Cruising speed	75	121
Landing speed	35	57
Take-off run	70 yards (64 m.)	
Initial rate of climb	580 ft./min. (2,96 m./sec.)	
Service ceiling	14,000 ft. (4 270 m.)	
Duration, 3½ hours		
Range	250 miles at 75 m.p.h. (400 km. at 121 km./h.)	

THE S.M.1 : The tailplane is placed high on the fin, which is held to be the best placing for checking spinning tendencies. (FLIGHT *Photo.*)



THE SHACKLETON-LEE MURRAY S.M.1 : Three-view general arrangement drawings.

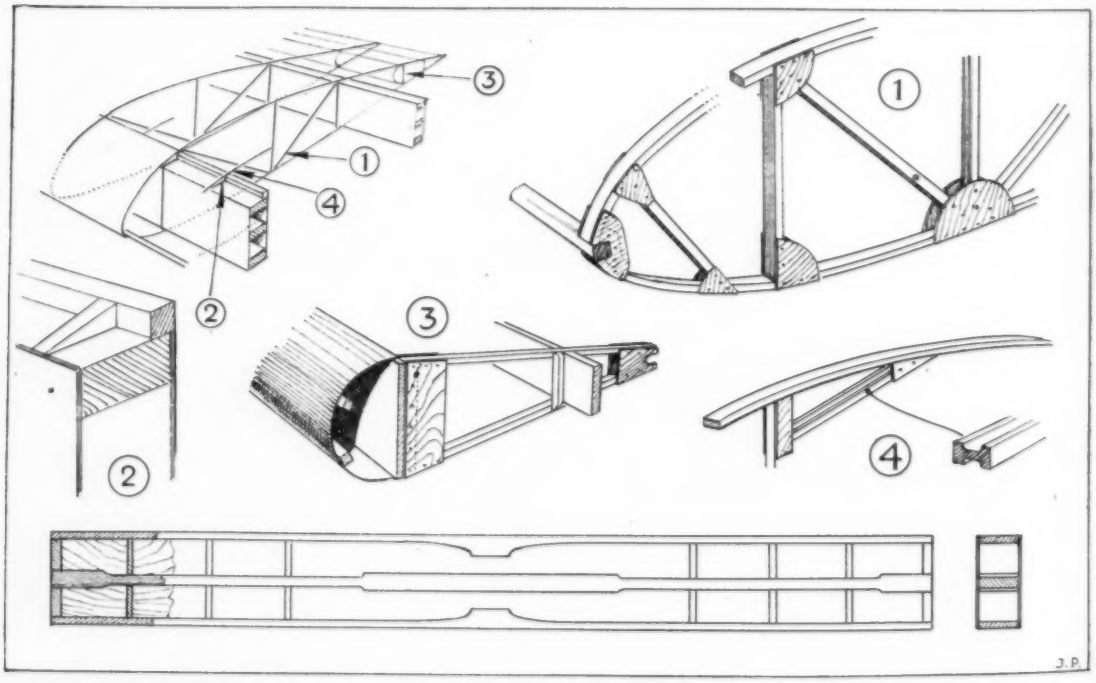


ON THE S.M.1 : The instrument board in the front cockpit. (FLIGHT *Sketch.*)

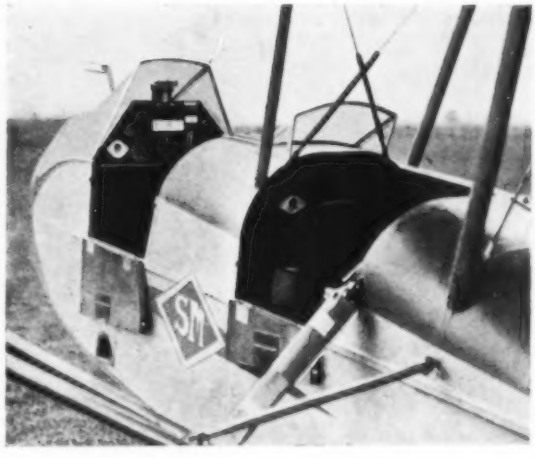
Apart from the absence of noise and slipstream, oil and exhaust fumes, the pusher had the very great advantage of view for the pilot. When A. V. Roe introduced the tractor, he showed the world the way to better performance, but he also started a fashion which was to make such things as comfort almost unattainable, and view for the pilot a gradually dwindling quantity. The first tractors were fairly slow, because they were of low power. The pilot was placed high in (or almost on top of) the fuselage, and had to put up with the draught. The engines became more and more powerful. Half of the pilot's body exposed was no longer a practical arrangement, and he sank deeper and deeper into the fuselage, which in turn became larger and larger. And so we came, during and shortly after the war, to the machine in which view and comfort were both sadly reduced. The restricted view, the oily faces, and the half-deafened ears came to be accepted as part and parcel of flying. One accepted them without thinking very much about them. Modern aeroplanes are a good deal better, but when the engine has been silenced, the oil and fumes kept in, the view improved and everything done to minimise the disadvantages of the tractor type, there still remains the slipstream. In a cabin machine this is not very important, except perhaps in some cases where a certain amount of "drumming" is present, but in an open cockpit machine one cannot lean out without having one's face buffeted by the slipstream.

The main reason for the change-over, in the early days of flying, from pusher to tractor was performance. The early pushers had their tail carried on an open girder, which was often a maze of struts and wires, and which therefore gave rise to considerable drag. The consequence was that, power for power, the pushers were much slower than the tractors. When performance became, during the war, almost the only quality which mattered, the tractor held the field unchallenged, and became so much the standard orthodox type that after the war no one thought of making anything else, and if they had done so, prejudice would probably have prevented the pusher from "catching on."

Nowadays so many unusual aircraft of different kinds have been produced that it is easier to overcome prejudice, and the reintroduction of the pusher should not present the same difficulties. That the type has many advantages cannot well be denied, and we welcome the first appearance of the little two-seater produced by Shackleton and



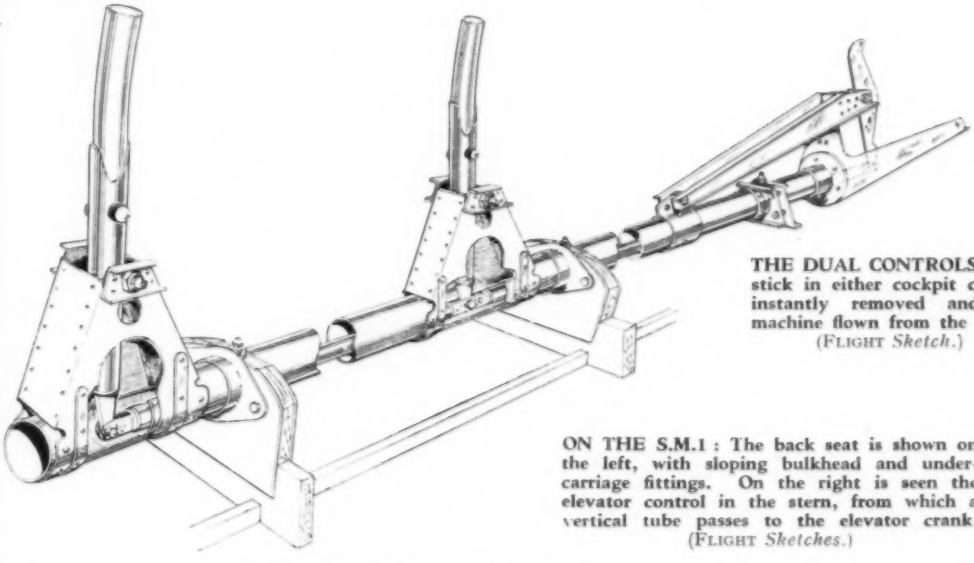
WING DETAILS : The key diagram serves to indicate the position of the structural details shown in the other sketches. Both wing spars are alike and their construction is shown in the lower sketch, which is not to scale. (FLIGHT *Sketches.*)



THE COCKPITS : Entering and leaving does not call for acrobatic ability in the S.M.1. (FLIGHT *Photo.*)

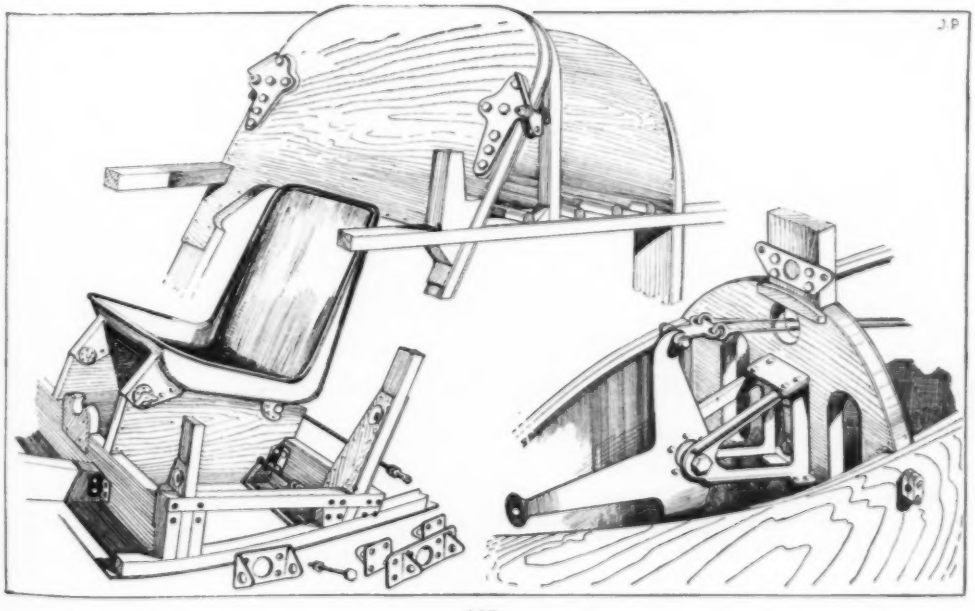
Lee Murray. The original idea for the design of this machine came, we understand, from Mr. Lee Murray, who returned to England from Australia via the United States. There he flew, among many other types, the little Curtiss-Wright "Junior," and was so impressed by the comfort, view and general pleasantness that when he and Mr. Shackleton reunited in England, they decided that their first machine should be a pusher. The S.M.1 is the result.

The S.M.1 is a parasol monoplane two-seater intended as a small touring machine for the private owner, and as a school machine for clubs. It was built by Airspeed, Ltd., at York. Economy in first cost, operation and upkeep were to be first considerations, and for that reason high performance was not aimed at, but rather a design in which low landing speed, ease of handling and general comfort were the main features. A German engine was chosen for the first machine because it was considered that its power was sufficient, its arrangement such as to suit the design, and the general characteristics lent themselves to the machine which Shackleton and Lee Murray



THE DUAL CONTROLS: The stick in either cockpit can be instantly removed and the machine flown from the other. (FLIGHT *Sketch.*)

ON THE S.M.1 : The back seat is shown on the left, with sloping bulkhead and undercarriage fittings. On the right is seen the elevator control in the stern, from which a vertical tube passes to the elevator crank. (FLIGHT *Sketches.*)



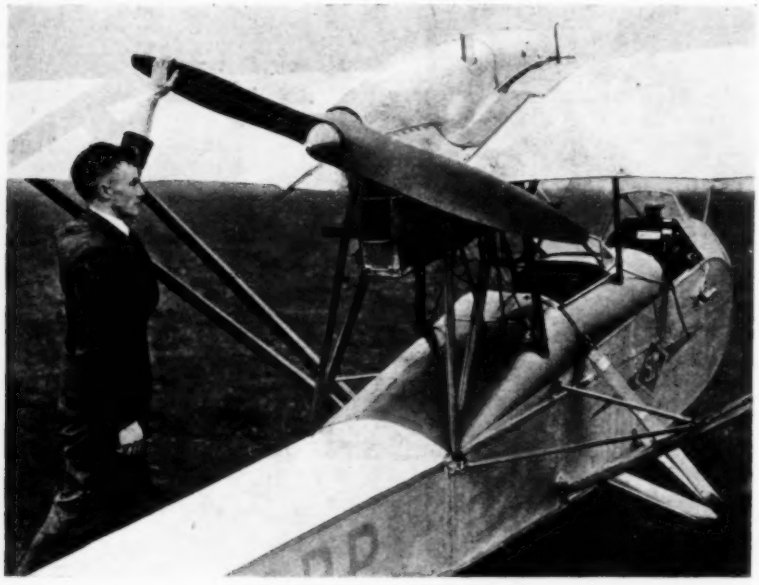
had in mind. This was the Hirth H.M.60, a 4-cylinder inverted air-cooled developing a normal power of 70 b.h.p. The experimental flights made with the S.M.1 have shown the Hirth engine to be entirely suitable, to run very smoothly indeed, and to keep quite cool under all conditions when used to drive a pusher airscrew. The production model will probably have the Pobjoy "R" engine, because by the time duty has been paid on the Hirth, its price is rather prohibitive.

General Features

The S.M.1 has its fuselage set so low over the ground that not only is access to the cockpits greatly facilitated, but the centre of gravity is lowered a good deal, and it should be almost impossible to turn the machine on its nose, since even with the nose skid on the ground the vertical line through the c.g. still falls behind the centre of the wheels. By landing *very* fast and applying the wheel brakes suddenly, it might just be possible, but even this seems doubtful. Landing is made easy also by the fact that the pilot has a very excellent view, and is placed so low over the ground that at the moment of contact the chance of making an error is very small indeed.

The use of a pusher airscrew, in addition to the comfort which it confers on the occupants, also has the advantage that the airscrew itself is not liable to damage. Many a propeller has been damaged by striking the ground when the machine stood on its nose. Even when the machine does not turn right over, but merely tilts gently on to its nose, the airscrew is almost certain to be damaged in a

SET HIGH: The tailplane of the S.M.1 is carried on two tripods, but one "leg" of each is a wire. The worm drive for trimming is housed in the fin. (FLIGHT *Photo.*)



ONE ADVANTAGE OF THE "PUSHER": The propeller can be easily reached for swinging, but being behind the wing and doors there is little opportunity for passengers to walk into it. (FLIGHT *Photo.*)

THE S.M.1: This three-quarter front view gives some idea of the excellent view obtained, particularly from the front cockpit. (FLIGHT *Photo.*)

tractor, and quite possibly the crankshaft of the engine is bent. The pusher should have a very low "airscrew consumption."

Dual controls are fitted, so that the machine is suitable for school work. The joy stick can be removed from either cockpit, and the machine can then be flown from the other. For photography, for example, the front cockpit would be ideal.

Wing folding has been arranged for, and as the folded width of the machine is only 12 ft. 9 in. garaging is simplified.

Specification

Fuselage.—The fuselage of the S.M.1 is of orthodox construction, with spruce longerons, spruce and plywood bulkheads, and plywood covering. The fuselage is very shallow at the back, to give clearance for the airscrew, and the top longerons continue forward in a straight line, the extra depth in the nose being built on in the form of a fairly deep deck fairing, with cockpit coamings and side doors.

Wings.—The wings are strut braced to the fuselage, and their front and rear spars identical except for a few packing blocks. The spars are of the box type, with spruce flanges and three-ply birch sides. The grain of the plywood is at an angle of 45 degrees to enable the full shear strength to be developed.

The wing ribs are of spruce and three-ply birch. All the ribs are alike, and the standard rib weighs but 5 oz. For this very low weight it carried successfully a load of 450 lb. under test, which represents a factor of 17 at large angle of incidence.

The internal drag bracing consists of steel tube compression struts and diagonal wires. The bracing is so arranged that all the wires in the different bays are of identical length. The ailerons are carried each on three hinges, supported on short vee struts of welded tubing, the placing of these vee struts being in line with the internal drag struts. The wing tips are faired off, the material used being *papier maché* mounted on light formers and moulded to shape. In case of damage this fairing can easily be renewed.

The wing bracing struts are streamline steel tubes, arranged in the form of a vee, and steadying struts run from them to the top longerons. The folding hinge is on the rear spar where this joins the spar of the centre section, and the bracing strut attachment to the lower longerons is in line with the hinge. The inner portion of the trailing edge is hinged for folding the wings.

Tail Unit.—The tail is of orthodox wood construction, the fin is built in with the fuselage to ensure rigidity, and the tail plane is mounted high on the fin to enable the rudder to remain effective in a spin. Bracing of the tail-plane on each side consists of two tubes in the form of an inverted vee, and of a single wire. A tail trimming gear is fitted, and incorporates an irreversible screw with square thread.

Undercarriage.—The undercarriage is of the split axle type, with axle, radius rod and telescopic leg on each side. Springing is by an oleo-spring combination, and the telescopic struts permit of a wheel rise of 8 inches. The energy absorption is sufficient for a vertical velocity of 12 ft./sec. The wheels are Dunlop low-pressure fitted with Bendix brakes. The brakes can be operated together or independently, the brake pedals being mounted on the rudder pedals. Torque reaction from the application of the brakes is taken by the axles in torsion. The tail wheel is fully castering, and is a special Dunlop of 5 in. diameter, solid rubber. The wheel is mounted on steel forks to a sliding chrome-nickel steel tube. 5 in. of vertical movement is available against a high tensile steel spring, combined with rebound shock absorber rubbers. A mud scraper is fitted to prevent jamming, and a leather gaiter packed with grease protects the sliding parts against mud and grit.

Power Plant.—The engine fitted is, as already mentioned, a Hirth of 70 b.h.p. It is a four-cylinder inverted air cooled in line, with a bore of 100 mm. and a stroke of 110 mm., giving a capacity of 3,456 c.c., or approximately 3½ litres. All bearings in the engine are of either roller or ball bearing type, and dual ignition is by coil. Rubber buffers are interposed between the engine and bearers. The engine is mounted on streamline section steel tubes, and fireproof bulkheads are interposed between tanks and engine and between wings and engine. The wooden airscrew has a diameter of 6 ft., and there is a clearance of 3 in. between the propeller tips and the fuselage deck.

The combined petrol and oil tank is of welded aluminium sheet and is mounted in the centre-section. From there supply to the engine is by simple gravity feed, and the fact that the tank is in front of the engine increases the head of petrol during a steep climb. The petrol capacity is 13 gallons and the oil capacity 1 gallon.

The main data relating to the S.M.1 are given in the table on p. 440. We understand that the machine is likely to be at Hanworth this week-end.

S., M. AND S.M.1 : On the left, Mr. Lee Murray, and on the right Mr. W. Shackleton. (FLIGHT *Photo.*)

MILITARY "DRAGONS" FOR IRAQ

Eight Machines Delivered by Air

THE eight "Dragons" specially built by the de Havilland Co. for the Iraqi Air Force were completed last week, and were assembled at the De Havilland aerodrome at Hatfield for the start of the flight to their new home. The Iraqi officers who are flying the machines to Iraq have been trained in England. They are: Rais (Capt.) Muhammed Ali Jewad, Rais Akram Mushtag, Mulassim Awal (Lt.) Hofdhi Aziz, Mulassim Awal Muhammed Yasin, and Mulassim Awal Nazir. Other members of the party included Flt. Lts. H. E. Forrow and C. L. Carter, R.A.F., and Flt. Sgts. Godfrey and Humphrey.

The eight machines left Hatfield on May 5, and at the moment of going to Press there has been no news of their further progress. Cynics point out that when the machines were last seen at Hatfield they were flying in excellent formation, *heading North!* And there is still a deep depression over Iceland.

The eight "Dragons" ("Gipsy Major" engines) are intended to form the bomber squadron of the Iraqi Air Force, which already possesses a number of de Havilland "Moths." They have been fitted to carry out a variety of military duties. For example, as a reconnaissance aircraft the "Dragon" can carry three machine guns, a crew of three, wireless, camera, etc., and has a range of 700 miles. As a bomber the "Dragon" carries the same armament and crew, and 16 20-lb. bombs. As a troop carrier it will carry six fully-armed men, and as an ambulance four stretcher cases on full-size service type stretchers, and an attendant. The machines are also equipped with emergency wireless for use on the ground, and carry emergency rations, drinking water and a hook for picking up messages.

The civil "Dragon" has a top speed of 130 m.p.h. and cruises at 110 m.p.h., and will fly with full load with one engine stopped. Performance figures for the military type "Dragon" are not available, but they do not, presumably, differ greatly from those of the civil type.

The Officers' Advisory Society

THE Officers' Advisory Society who operate from the Royal United Service Institution, Whitehall, have just issued a Gazette at the suggestion of certain members. The objects of the Society are to bring about the unity of all serving and retired regular officers, to assist officers in avoiding the pitfalls of commercial matters in civilian life, to provide officers with any information free of charge and to assist retired officers who are about to enter civilian life. Officers of all three services are, on the average, not particularly well versed in matters of business in civilian life; to them this society should be a boon. In the matter of finding employment, so many shark agencies exist in London that it is easy to fall among thieves. Air Vice Marshal C. A. H. Longcroft represents the Royal Air Force on the Committee, and if the finding of employment for Shore Service Commission Officers comes within the scope of the Society's work it can be recommended to them. In these days of unemployment any society which genuinely sets out to help is well worthy of every support.

German Award for Britishers

THE German Government have decided to present gold watches to the captain, chief officer, and wireless operator of the British Indian steamship *Karagola*, for services rendered to Capt. Von Gronau when he was forced down in the sea near Rangoon.

NEW CHIEF OF AIR STAFF

Appointment of Sir Edward Ellington, K.C.B., C.M.G., C.B.E., A.D.C.

THE Air Ministry announces that His Majesty the King, on the recommendation of the Marquess of Londonderry, Secretary of State for Air, has been pleased to approve the appointment of Air Chief Marshal Sir Edward L. Ellington, K.C.B., C.M.G., C.B.E., A.D.C., as Chief of the Air Staff in succession to the late Air Chief Marshal Sir W. Geoffrey H. Salmond, K.C.B., K.C.M.G., D.S.O.

The appointment will take effect from May 22, 1933, on which date Marshal of the Royal Air Force Sir John Salmond, who had temporarily resumed the duties of the post, will cease to act and will return to the half-pay list.

Air Chief Marshal Sir Edward L. Ellington, K.C.B., C.M.G., C.B.E., was born in London in December, 1877, and was educated at Clifton College and the Royal Military Academy. He was commissioned in 1897 to the Royal Artillery, and, in succession, was promoted Lieutenant and Captain in that arm. He graduated at the Staff College, Camberley, in 1907-8. In 1912 he began flying and graduated as a pilot, his Royal Aero Club ticket being No. 305 of October 1, 1912. He was appointed to the Royal Flying Corps in the following year.

He went to France on regimental duty in August, 1914, and was employed in France on the staff from September, 1915, to February, 1916. He was then posted to a staff appointment at the War Office and at the end of that year proceeded again to France on staff duties. Towards the end of 1917 he returned to the War Office as Deputy Director General of Military Aeronautics and in January, 1918, he was promoted to be Director General of Military Aeronautics. In the meantime (1917) he had been promoted to the rank of Brigadier General; on April 1, 1918, he was promoted Major-General in the Royal Air Force.

In August, 1918, he was appointed Controller General of Equipment at the Air Ministry, and on the reorganisation of the Ministry in February, 1919, he became Director General of Supply and Research.

For his services in the Great War he received the awards of C.B., C.M.G., and C.B.E., with two brevets, and was mentioned in despatches on three occasions, besides having several foreign Orders bestowed upon him. He was awarded the K.C.B. in the Birthday Honours List of 1920.

(FLIGHT *Photo.*)

Two years later, in 1922, he proceeded to Egypt to take over the command of the Royal Air Force, Middle East, and in 1923 he was posted to India on appointment as Air Officer Commanding, Royal Air Force, India.

In November, 1926, he became Air Officer Commanding, Royal Air Force, Iraq, a post which he held until he was appointed in January, 1929, to be Air Officer Commanding in Chief, Air Defence of Great Britain. In September, 1931, he became Air Member of Council for Personnel at the Air Ministry.

In August, 1919, Sir Edward Ellington was granted a permanent commission in the Royal Air Force with the rank of Air Vice-Marshal. He was promoted Air Marshal in July, 1929, and Air Chief Marshal in January of the present year (1933). He was appointed principal Air A.D.C. to His Majesty in March, 1930.

During his command in India Sir Edward Ellington was responsible for conducting the first operations of magnitude in India in which the Royal Air Force was used independently of the Army to deal with a situation that had got beyond the resources of the political officers. These operations, which took place against the Mahsuds in 1925, were entirely successful and were achieved at comparatively small cost.

While he was in command in Iraq he also conducted certain operations against recalcitrant tribes which entered Iraq from the neighbouring country of Nejd. These, too, were brought to a successful and rapid conclusion.

French Seaplane for Atlantic Service

THE new seaplane for the South Atlantic crossing will shortly be tested in France. It is a four-engined Blériot of 3,000 h.p., and is expected to attain a speed of 140 m.p.h., with a cruising range of 2,200 miles. It will have a crew of five and carry 1,320 lb. of cargo. The engines are accessible for repairs during flight.

Site for Aerodrome in West Midlands

THE Town Council of Walsall have purchased a site, about 220 acres in extent, suitable for an aerodrome, and are willing to receive offers from companies or individuals who would be prepared to assist in developing the same. The site is 8½ miles from the centre of Birmingham and 2 miles from the centre of Walsall, and there is a population of 2 millions within a 10 mile radius. For particulars apply H. LEE, Town Clerk, Walsall.

Commercial Airways, Ltd.

COMMERCIAL AIRWAYS, LTD., who are operating from Loughton Aerodrome, Abridge, Essex, have been formed to provide regular air services to principal towns in Great Britain. Machines may also be chartered for practically any use—taxi work, photography, instruction and joy-riding. The Company are also operating the East Anglian Aero Club through which flying can be obtained at the cheapest possible rate. A new and up-to-date clubhouse is almost ready for occupation by the large number of members who have already joined.

Air Marshal at Buckingham Palace

HIS MAJESTY THE KING, on Monday, May 8, received in audience, at Buckingham Palace, Sir Robert Brooke-Popham on his appointment as Air Officer Commanding-in-Chief, Air Defence of Great Britain.

Sir Edwin Alliott Verdon Roe

IT was announced in the *London Gazette* on Tuesday, May 2, that Sir Edwin Alliott Verdon Roe, of Hamble House, Hamble, Southampton, has abandoned the surname Roe, and in lieu thereof adopted the surname Verdon-Roe.

Moscow May Day

THE greatest military and air display was held at Moscow on May Day. Over 350 aeroplanes and nearly 300 tanks took part. The machines, more than half of them heavy bombers, flew over Lenin's tomb. Although the ceremony was impressive, it is reported that little enthusiasm was shown by the populace.

French Air Minister's Solo Flight

M. PIERRE COT, the young French Air Minister, has recently made his first solo at Le Bourget.

From the Clubs

BROOKLANDS

The fine weather has kept the School "Moths" very busy during the past week, and a large number of hours have been flown. Among those who have taken instruction we may mention Mr. C. H. Hayter, who achieved a very successful first solo and is now looking forward to those three hours and his "A" licence! Capt. Davis and Mr. Barr, the Sales Manager of Brooklands Aviation, Ltd., have just returned from a flying tour which covered many of the districts for which the Company are de Havilland concessionnaires. During the week there have been a large number of visiting aircraft; these include the "Puss Moth" of Mr. Whitney Straight, who has been a constant visitor while practising on the track for the J.C.C.'s International Trophy Race. A very large number of machines came to Brooklands for the afternoon of Saturday, May 6, the attraction being this same race; at one time there were some 35 aircraft in the visitors' park, all the School machines busy on instruction and joyrides, and two of Brooklands Airways' machines also working at full pressure. The College of Aeronautical Engineering Aero Club has been busy, and one student of the College—Mr. Crossley—completed his height test during the week. Two lady members of the Club—Miss Moodie and Miss Oldacres—have been doing considerable cross-country flying in the Brooklands "Moths." New members: Messrs. Woodhouse Temple and Villiers.

Mr. John Grierson has had his "Moth" *Rouge et Noir*, which he keeps at Brooklands, fitted up with Marconi-Robinson directional wireless. As well as hearing the children's hour from Daventry—which he tuned in for the benefit of the aerodrome staff while the machine was on the ground!—he is also practising with it for direction-finding, and hopes to take his wireless licence shortly. It is understood that he will be leaving on a record-breaking long-distance flight in the near future. The wireless equipment which is designed to give him his bearing from the signal of any ordinary transmitting station should assist him materially to maintain his correct course. The set is very compact and, together with its batteries, fits into the luggage locker behind the pilot's cockpit. The directional loop aerial is fitted around the leading edges of the main planes and down the interplane struts. Mr. Waller is now concluding the tests for his "B" licence.

HANWORTH (N.F.S.)

The fine weather on Sunday made business very brisk at Hanworth. On Monday Capt. Wilson flew a Press photographer to photograph the collision between two Channel boats. Cross-country flights included Capt. Findlay and Mr. Hoile to Castle Bromwich and return, Mr. Addinsele to Gloucester and Bristol, Cadet Soam to Portsmouth and Reading and return. Many visitors flew over to watch the demonstration of the new wingless autogiro. M. de Mailly Nesle arrived from France in his "Fox Moth." He is contemplating a flight to Indo-China. A new B.A.C. "Drone" was tested and delivered to Maidstone during the week, it possesses the new sunk tank, which gives the machine a duration of 3½ hr.

LYMPNE

The Cinque Ports Club has done some 50 hr. last week—excellent going, when it is remembered that one of the Club machines was unable to take the air, owing to a top overhaul being in progress. The Club is able to report another three first soloists—Miss F. Malden, Mr. C. G. T. Alington and Mr. J. R. Harris. Miss Malden was unfortunate in having to return to her work at St. Christopher's School before she had time to complete her tests, but Mr. Alington obtained his "A" the day before he had to return to school. He is this year's youngest pupil, being just 17. New members include Mr. E. J. Boyle and Mr. J. W. Hurdnall, of the Small Arms School; Mr. Patrick Randolph, who is taking the same Small Arms Course, is housing his machine at the aerodrome. Mr. du Portis, at the Tanks Corps Depôt at Lydd, and he certainly seems to have aroused some interest there, for several inquiries have been received by the Club from that quarter. If this goes on Lympne will have quite a military atmosphere! On Sunday Councillor and Mrs. Ford, from Hastings, visited the aerodrome and had their first flights. They were most enthusiastic, and seem to have become thoroughly air-minded! On Tuesday the Fairey-Napier long-distance monoplane landed at Lympne on its way home and created much interest. Mr. Noble has bought a "Fox Moth," which was delivered at Lympne last Saturday. He arrived in time for the Wedding of Miss Pam Belas and Mr. A. Chester Beatty, junr., who are both members of the Club. Another machine is to be added to the fleet, as the Club is so busy that it will be needed. Several members are visiting Liége this week-end for the Week-End Aerien on their own machines, but, unfortunately, none of the Club aircraft can be spared as well.

MAIDSTONE AERO CLUB

The Maidstone Flying School has obtained the services of Mr. W. A. C. Kingham as second instructor. The School has also acquired another "Gipsy Moth," which will be available for bookings from May 6. On Sunday, May 7, from 3 p.m., the Club monthly "At Home" will be held, and members are particularly requested to take this opportunity of introducing guests and new members. During the remainder of the month the management are making an effort to decorate the club-house, and start the extensions; therefore, no special week-end attractions will be fixed for the remainder of the month. The Maidstone Service Station is now in a position to attend to members' cars and carry out overhauls under the management of Mr. Joyce Clarke. Members are reminded that horses are available at the Airport every Sunday afternoon for bookings through Mr. John Lambton. Sunday evening dancing is being continued with orchestra every Sunday from 7.30 p.m.

SURREY AERO CLUB

On May 1, the Spartan "Cruiser" of Spartan Air Lines, which was making its first trip from the Isle of Wight to Heston, landed at Gatwick on account of bad weather. The passengers were taken to Horley station by car to catch the train to Victoria. On Sunday, May 14, it is hoped to arrange a visit by air to Reading, and any interested should arrive at Gatwick by noon. Mr. and Miss Tyzack and Mr. Linell from Northampton called in on Sunday, April 30, having just taken part in the Dawn Patrol attack on Reading; they claimed to be the only machines to get there without being spotted. Arrangements have now been made with Mr. Sam Marsh, of the Redhill Riding Academy, to have horses permanently on the aerodrome for the use of members. A Buffet Supper Dance is being arranged for Saturday, May 20, for members and their friends, and it is hoped the attendance will exceed that of previous dances.

READING AERO CLUB

The Dawn Patrol was again abroad on Sunday, May 7; this time on the defensive against Sywell, Brooklands, Stag Lane and Leicester, and very few were able to claim free breakfasts. The day was further enlivened by the visit of the British Hospitals' Show. Orders for the "Hawk" are pouring in, and Phillips & Powis look like being busy for some time to come. Next Sunday the Surrey Club are being entertained.

GRAVESEND SCHOOL OF FLYING

Gravesend School of Flying have now their first private owner in Mr. F. W. Humphrey, who has bought an "Avian," which he is having housed and maintained at Gravesend. The School's Desoutter has been sold and a new "Fox Moth" purchased. Mr. Atkins has joined the School for instruction; Mr. Lindfroth for renewal of "A" licence. Messrs. Coates, Vale, Florence and Barnes are now due for solo.

NORTHAMPTONSHIRE AERO CLUB

It is extremely difficult to make a report on the activities of the Northampton Club for the past week; this does not mean that nothing has happened, but simply that all the work has been of the usual routine nature, with no undue "alarms and excursions." This is very trying from the scribe's point of view, but the Club officials regard it as a good sign when there is nothing to say; they argue

that these are the times when everything is going properly! One spot of amusement to which all are looking forward is the Dawn Patrol—or "the defence of Reading"—which will take place at the week-end. Sywell has done extremely well in other Patrols, and is in high hopes of breaking a few records at this one. There has been a large number of visitors to the aerodrome during the week, as well as those who fly with the Club; this is a good omen, for most of those who look round seem to be very interested, and it is hoped that some of them will shortly be seen under instruction!

HAMPSHIRE AEROPLANE CLUB

During April 53 members flew on Club aircraft, making a total of 201 hr. for the month. The first landing competition of the year for the Silver Moth Landing Trophy was held on Sunday, April 23, and won by W. Clifford Matthews, who qualified for an "A" licence at the beginning of the year. On Saturday, April 29, Sir Alan Cobham's Air Display took place, which gave the Club a considerable boost. Two of the Club's aircraft "joyrode" throughout the day, which made up for lost flying. Among recent members to qualify for their "A" licence is Mr. Alec Bennett, the famous T.T. rider, who has lately taken up flying again after a lapse of 14 years, when he was in the R.F.C.

EASTERN COUNTIES AEROPLANE CLUB

The flying times for the previous month amounted to 26 hr. 5 min. dual, and 42 hr. 15 min. solo. Messrs. Johnston and McClean did first solos, Harbourne and Johnston "A" licence tests and Briscoe and Powell passenger-carrying tests. Mr. Rodd flew a cross-country to Maidstone; Mr. Prentice to Midhurst, and Mr. Saunders to Cambridge. Mr. Read was taken for his first flight above the clouds, and expressed his opinion that the air was like Switzerland. Visiting aircraft during the month included two "Puss Moths," an "Autogiro," which lowered itself steadily down out of a fog on to the grass in front of the clubhouse, a "Dragon," a Klemm and "Moth" G-AALT, chartered by the *Daily Express*.

LEICESTERSHIRE AERO CLUB

The weather during April has, on the whole, been excellent, and 146 hr. 30 min. paid flying was carried out on Club machines, which shows a great improvement. Demonstrations were given by the Avro "Cadet," Redwing and "Tiger Moth," and several members flew each type; 51 machines of 14 different types visited Desford on pleasure or business, and 43 cross-country flights were carried out in Club machines, visiting 15 different aerodromes. First solo flights were done by G. H. Wilson-Fox, A. W. Wathes and P. J. H. Heycock, and "A" licences were obtained by G. H. Wilson-Fox and T. S. H. Bailey. Four pilot members recently returned from a cruise wearing badges of the Aero Club of Italy. They had been very hospitably entertained by the Aero Club at Naples.

LIVERPOOL AND DISTRICT AERO CLUB

The Club cannot complain about the weather during the past month, flying time totalling 239 hr. 30 min., which is an increase of 90 hr. on the total for April of last year. Night flying has suffered in some degree by reason of the misty evenings, but even so 13 hr. 30 min. has been done. Mr. A. Heaton, who has been at Castle Bromwich, has taken up duty as second instructor, replacing Mr. Higgins, who is guiding the destinies of the newly-formed West Coast Aero Co. at Squire's Gate, Blackpool. The Club is awaiting delivery of their new machine—a Sports "Avian" fitted with a "Gipsy III" engine. It is as well to mention that the Club are entertaining on their aerodrome a host of woolly guests and their offsprings. So it behoves all visitors, and particularly those who go roaming in the gloaming, to keep a very sharp look out or alternatively to bring their own mint sauce. These guests are becoming very air-minded and *blasé*, to such an extent that nothing short of *Hannibal* will merit their attention. So visitors must not blame the Club if they happen to get a nice fat ewe wound around their prop. The Club's Annual Report has just been issued, and shows that last year was a very successful one for the Club. The membership increased from 281 to 297, and the number of hours flown from 2,062 to 2,367. What is most worthy of note is the fact that since the formation of the Club in July, 1928, 8,361 hr. have been flown, or about 670,000 miles. During the year 25 "A" licences were obtained and 57 renewed. On the new rates the Club has earned the satisfactory figure of £1,171, which represents a contribution by the State of 9s. 10½d. per hr., of which 3s. 9d. has been returned to the State in petrol duty. The Club have been fortunate in securing the consent of Lord Leverhulme and Sir Kenneth Crossley to give official support as Vice-Presidents. Two strong supporters have been lost—Lord Wavertree and Sir James Reynolds, who died during the year—and by the death of Capt. J. Ellis, who has been the Secretary since the Club's formation, a valuable servant has also been lost.

LINCOLNSHIRE AERO CLUB

The Club has now taken over the new aerodrome at Cheapside, Waltham, near Grimsby, Capt. L. S. Tindall, who has served in the R.A.F., has been appointed Chief Instructor. Although flying has only been started for three weeks, the membership is now approaching the 100 mark, and applications are coming in daily. During the past three weeks 35 hr. have been flown on Club machines. Eight members are already well on their way to "A" licences. Taxi trips have been carried out by the Club's 3-seater "Spartan" to Darlington, Scarborough, Brigg and Hull (three times). The club-house is nearing completion and will be ready for the official opening and Air Display on Whit Monday. The Lincolnshire Club and the Skegness Club are co-operating in a joint "Aerial Week-End Party" at Whitsun, to which all pilots are invited. Several races and competitions are to be held, for which valuable trophies and cash prizes will be offered.

YORKSHIRE AEROPLANE CLUB

During the week 25 hr. were flown; one new member, Mr. J. L. S. Gill, has joined. Visitors included Mrs. Victor Bruce and F/O. Pugh in the Fairey "Fox," Flt. Lt. Clarkson and Mr. Gairdner in the demonstration D.H. "Dragon," and Capt. Cudemore in G-EBXS.

IRISH AERO CLUB

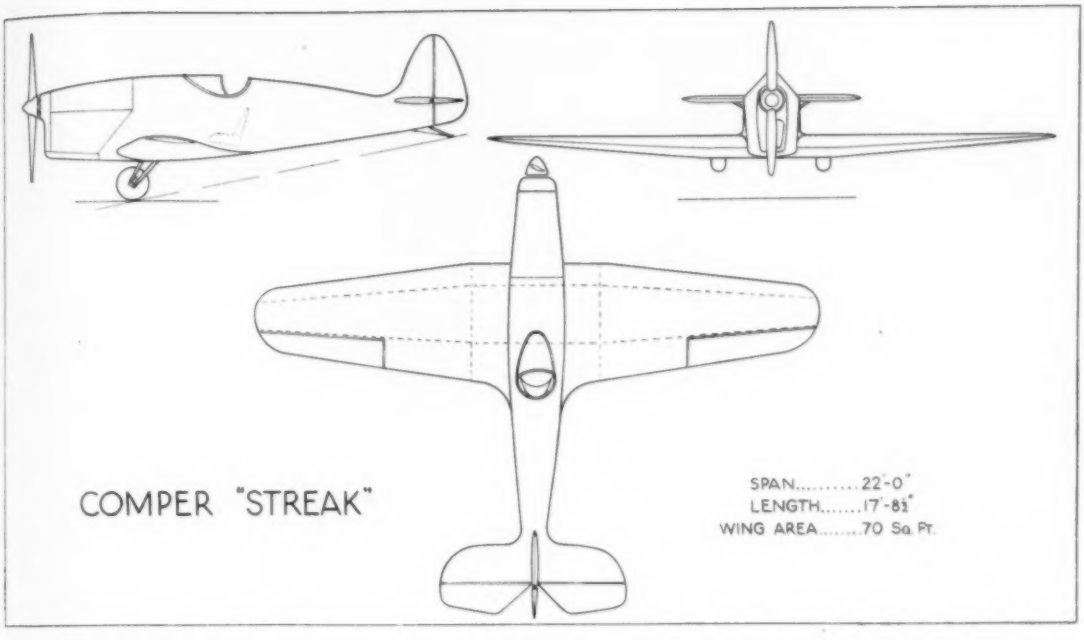
Some surprise was caused at the annual general meeting of the Club when a number of members of the Committee declined to go forward for re-election; these included the secretary, Mr. A. P. Reynolds, Dr. S. V. Furlong and Dr. G. E. Pepper. It was decided that the other members of the Committee should act in an emergency capacity, and the meeting was adjourned in order that the position might be considered. It is stated that the reason for the resignations is the Free State Government's apathy towards civil aviation. A successful "At Home" was held at Baldonnel recently, and two parachute descents were made with Gregory Quilter parachutes by Messrs. Gilmore and Bell, both making their first jumps. Mr. Raymond Quilter piloted the "Moth" carrying the parachutists. Lady Heath, who has been on holiday in Ireland, was amongst the guests.

AERO CLUB OF INDIA

The annual general meeting of the Aero Club of India and Burma was held recently at the Chelmsford Club in New Delhi, Mr. Arthur Moore presiding. The Commander-in-Chief was re-elected President and Sir M. B. Dadabhoy, President of the Council of State, and Mr. Shunmukham Chetty, President of the Legislative Assembly, as Vice-Presidents.

THE DE HAVILLAND SCHOOL OF FLYING

THE flying time for the past week was 81 hr. 20 min. The total time for April was 420 hr., and seven first solos were launched. The contingent of eight "Dragons" for Iraq left Hatfield on Friday for Paris, Flt. Lt. Forrow and Flt. Lt. Carter each leading a formation of four (see page 445). The American Army Air Attaché, Maj. Scanlon, flew here to say good-bye before leaving for home service. The club dance on May 6 was well attended, and everyone seemed to enjoy themselves thoroughly. The boxing tournament at Stag Lane between R.A.F. Army and de Havilland personnel was a great success, and so well supported that another is indicated. The boring operations of the artesian well to supply the new swimming pool with water have commenced, and a depth of 60 ft. has been reached. It is proposed to bore for 350 ft. The Stage and Screen Aero Club "Moth" has been flying most evenings. Mr. and Mrs. Rea successfully accomplished their first cross country, which was the ambitious one of Aldergrove and return. Sir Philip Sassoon arrived by car on Friday, and left for Abingdon by aeroplane at 8.15 p.m.



THE COMPER "STREAK": The engine can be any of the 4-cyl. air-cooled of under 6½ litres capacity.

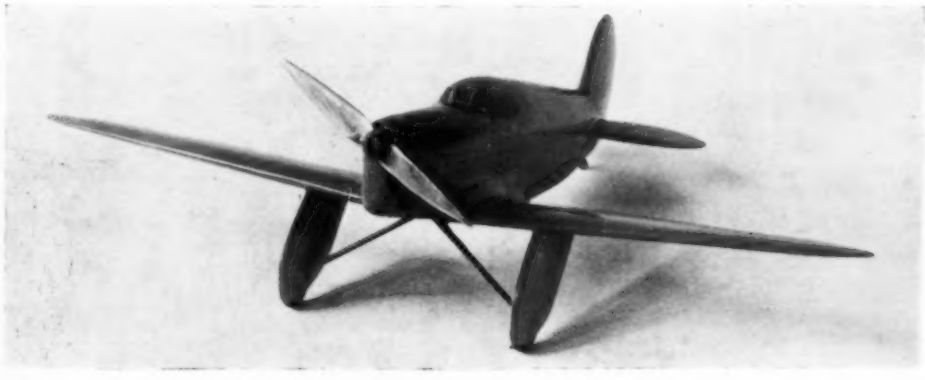
First Fruits

TWO NEW DESIGNS FOR THE INTERNATIONAL AIR RACES

ONE result of the American National Air Races has been the production of quite a number of really fast aeroplanes. In this country we have not, for very many years, had any air races in which the prizes offered were large enough to justify, except to a very limited extent, the production of special racing machines. The foundation this year of a company for promoting races on a large scale is likely to cause a change in the position. The first large international meeting will, it may be remembered, be held at the Portsmouth aerodrome on August 4, 5 and 7, and the competing machines will, as already announced in FLIGHT, be divided into three classes, according to engine capacity. Class A is for unlimited engine capacity, Class B for engines up to 8,750 c.c., and Class C. for engines up to 6,500 c.c. Below we publish illustrations and brief particulars of two new designs which promise extremely well, and any readers who may wish to have machines built for the International Air Races at Portsmouth would do well to communicate with either the Comper Aircraft Co., Ltd., at Heston, or with the Hendy Aircraft Co., of Shoreham Aerodrome, Shoreham, Sussex.

THE COMPER "STREAK"

THE Comper "Streak," whilst being a logical development of the Comper "Swift" for racing purposes, is an entirely new design, as will be seen from the general arrangement drawings. The fuselage greatly resembles that of the "Gipsy-Swift," but the cantilever wing is set low on the fuselage to give the pilot a good view for cornering, a matter of great importance in a machine to be used on a course like that at Portsmouth, where a



THE HENDY 330: Photograph of a scale model.

large number of turns will have to be made around the pylons. Handiness is also going to play a very important part, and a small machine like the "Streak" will probably get around corners much more easily and with less swinging wide than a larger and more powerful aeroplane.

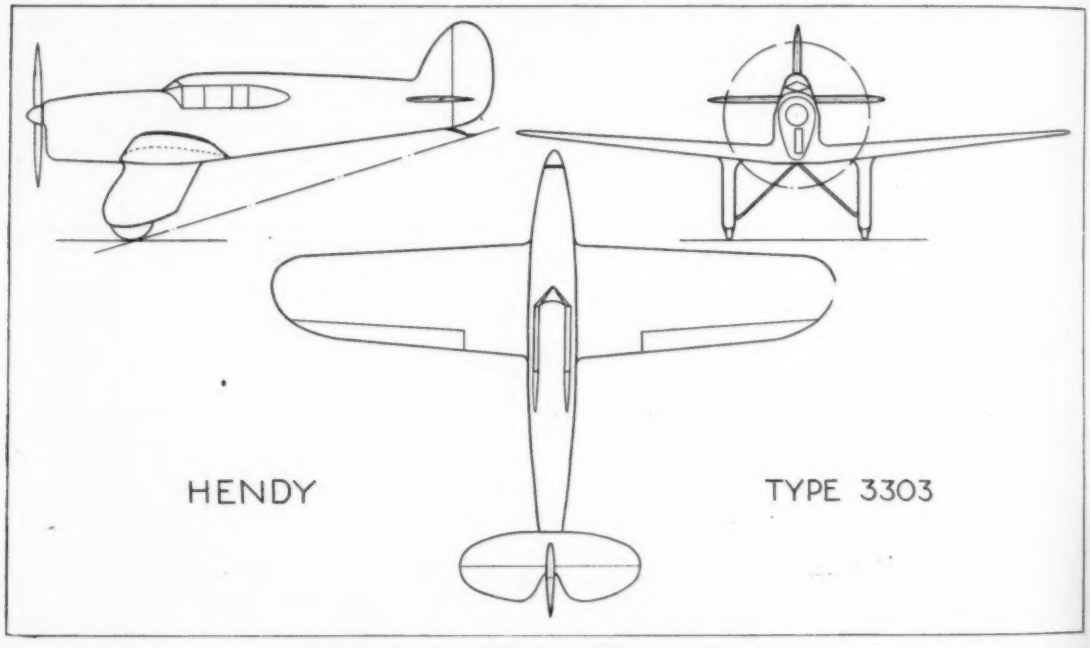
Resistance has been cut down to a minimum, and a retractable undercarriage will be used, for which also the low-wing monoplane arrangement is suitable. The Comper Aircraft Co. has been engaged upon the design of this undercarriage for a considerable period, and application for patents was made last year.

The "Streak" has been designed for engines in the "C" class, *i.e.*, up to 6½ litres capacity, and with these engines, of which several makes are available, it is estimated that a top speed of 200 m.p.h. should be attainable. The estimated landing speed is about 65 m.p.h. The Comper "Swifts" have ever been noted for their good rate of climb, and it is expected that the "Streak" will have an initial rate of climb of not less than 1,500 ft./min.

THE HENDY 3303

RESEMBLING in a general way the Hendy 302, the machine which Mr. Basil B. Henderson has designed for the International Air Races is intended for an engine of 6½ litres capacity. It will be mainly of wood construction, and the intention is to use Handley Page automatic wing tip slots, lift slots, and trailing edge flaps. The undercarriage will have its wheels enclosed in "spats," and designs have been got out for mechanism to retract the wheels completely into the spats when the machine is in the air.

With the engine which Mr. Henderson has in mind, he estimates that the top speed should be well over 200 m.p.h., while the landing speed with slots and flaps should not exceed 60 m.p.h., which is not high for a machine designed purely for racing. It will be seen that Mr. Henderson intends to make his machine a cabin type, with very low roof and small front windscreens.



THE HENDY 3303: General arrangement outline drawings.

UNBIASSED OPINION OF THE MILES "HAWK"

OUR readers are well aware of the qualifications which Flt. Lt. W. E. P. Johnson has for discussing the flying qualities of aircraft. We have therefore obtained the following notes from him concerning the Miles "Hawk" and are glad to see that he endorses the opinion we have already expressed about this delightful little machine.

"One of the most attractive features of this aeroplane is the natural attitude which it assumes in gliding for approaches and the consequent ease with which it may be brought into, and landed in, restricted space. The glide, surprisingly in an aeroplane with good performance, is uncritical. From the private ownership viewpoint, this is a factor of great importance; it is reasonable to assume that the most frequently occurring risk in flying, is that which is related to approaching and landing. It can also fairly be said that with technical improvement, many builders of aircraft have increased rather than decreased such risk. The 'Hawk' can be glided safely from 50-75 m.p.h. without inconvenient sink or float. I did steeply-banked gliding turns at 60 m.p.h. without any embarrassment.

"The take-off is straight and easy; climb very good and not 'blind.' The controls are harmonised throughout the speed range, and with engine on, attitude could be changed at will between 35-115 m.p.h. Mishandling had no catastrophic result. The 'Hawk' is slightly under-ruddered, but this is being rectified for production. Lateral control is excellent. Elevator control is positive without being dangerously responsive. The view, both taxying and flying, is admirable, and general comfort in regard to draughts, etc., is good. I criticise the entry to the cockpits as being somewhat too small; and I suggest that in production the throttle be re-positioned so as to avoid the possibility of it being kicked open whilst climbing in.

"In aerobatics the aeroplane did as well as I could make it without harness. Owing to this lack, I only slowly rolled once, but this manœuvre was smooth, easy, and had no nasty 'snatch' in it. Looping and rolling off was easy, and spinning, although rapid, perfectly mannerly up to six turns; the rate of descent being very low. There is no reversal of aileron in a spin to distract the pilot. The spin is not readily started, and unlikely to be inadvertent.

"This aeroplane is a wonder at the price at which it is promised. It has speed, performance, view, and that indefinable quality—'niceness.' I hope those responsible for it will rigorously avoid 'refining' it and will continue to be able to save the ha'porth of tar without spoiling the ship."

W. E. P. J.

Air Transport

COMMERCIAL AVIATION DAY AT LE BOURGET

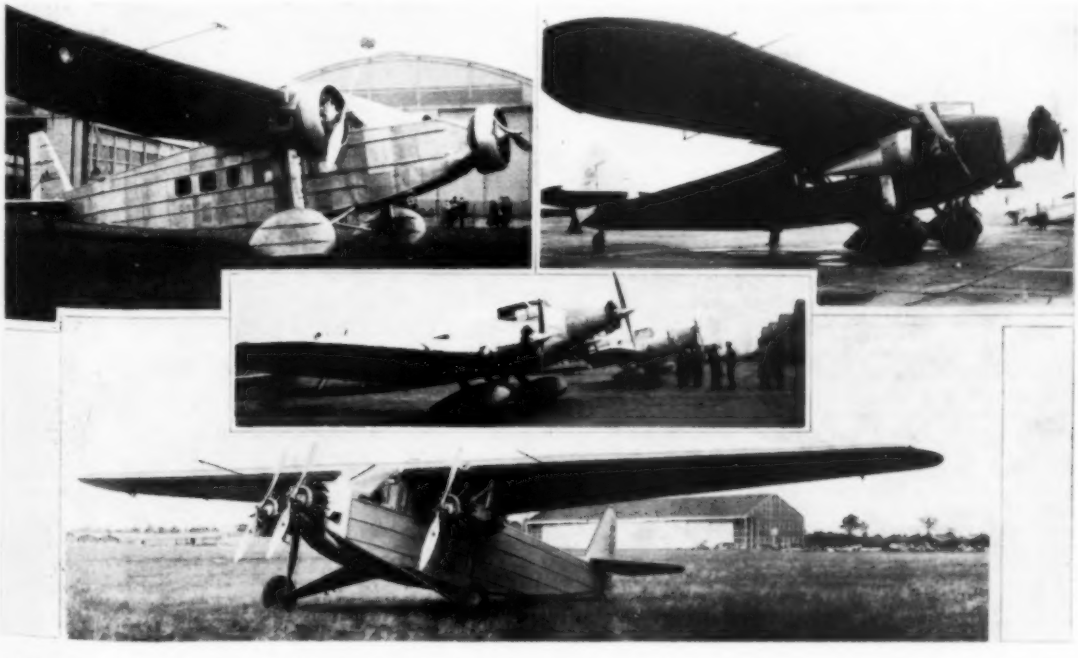
A COMMERCIAL REVIEW AT LE BOURGET: A general view of some of the machines lined up in front of the Custom House.

THE first one of the National Aviation Days organised by the Aero Club of France took place at Le Bourget Airport on April 30 last. It was devoted to commercial aviation and consisted of a display of various new types of transport aeroplanes just constructed and of machines now in service on the French air lines. Three British and a German transport aeroplane were likewise included in the list. The Air Ministry, the Chamber of Commerce of Paris, la Chambre Syndicale des Industries Aéronautiques and the Central Committee of the French air lines were also associated with the Aero Club of France and accorded their patronage to this meeting. The proceeds were devoted to the Aviation Relief Fund (Caisse de Secours de l'Aéronautique).

Notwithstanding the threatening weather a large crowd was in attendance. The concrete landing area in front of the Administration Building had been fenced off and some 30 aeroplanes were lined up there three rows deep. The President of the French Republic, M. Albert Lebrun, was the guest of honour and the Presidents of the various Chambers of Commerce throughout France, who had been attending their annual reunion in Paris were also among the distinguished visitors present.

President Lebrun arrived promptly at 10.30 a.m. and was received by M. Pierre Cot, the Air Minister, and M. Etienne Riche, President of the Aero Club of France. M. Laurent Eynac, former Air Minister, Marshal Petain, leading aviation officials (both military and civil), the heads of the air lines and a number of well-known constructors also composed the Reception Committee.

The Presidential Cortège first inspected the aeroplanes drawn up in front of the Administration Building and President Lebrun, who is a well-known engineer, asked many questions regarding the various details of their construction. As the official party arrived at the southerly end of the rows of aeroplanes, the big Imperial Airways' Handley Page 4-engined liner, *Horatius*, arrived from London and made an imposing sight as it taxied in and disembarked some 35 passengers and their baggage.



SOME FRENCH TRANSPORT PLANES: Left, the 10-passenger Marcel Bloch Type 70 (300-h.p. Lorraine "Algol"); right, the 8-passenger Potez 403 (300-h.p. Gnome-Rhone "Titan K7"); bottom, the 6-passenger Mureaux 140-T (120-h.p. Salmson). Inset is the familiar Couzinet.

After finishing the inspection of the aeroplanes the official guests visited the meteorological installations, the infirmary and the new buildings being erected at the airport. During this time the various aeroplanes that had been drawn up on the landing area took off and flew to the southerly end of the field, where they were lined up as before. They then took off again in succession and flew one by one for a review by the Presidential party, who had returned to the official enclosure in front of the Administration Building. A number of noted pilots were among those presenting these machines, including Michel Detroyat, Sadi Lecointe, Lucien Boussoutrot, Paul Codos, Maurice Rossi, etc.

An official reception and a luncheon then followed in the large hangar No. 1 of the Air Union Co., which closed the official exercises for the day. The various machines gave numerous short flights in the afternoon.

Among the planes displayed were several new three-engine machines.

The Mureaux 140-T, a six-passenger (pilot and navigator in addition) or postal cantilever monoplane of metal construction throughout, equipped with three 120-h.p. "Salmson" air-cooled engines, maximum speed 134 m.p.h., flight radius 565 miles.

The Marcel Bloch, type 70, a 10-passenger (pilot and navigator in addition) cantilever monoplane, equipped with three Lorraine 300-h.p. "Algol" air-cooled engines, maximum speed 154 m.p.h., flight radius 700 miles.

The Potez, type 403, eight-passenger (pilot and navigator in addition) monoplane, equipped with three 300-h.p. Gnome & Rhone "Titan Major" (K.7) air-cooled engines. This machine has been designed for operation in the Colonies. It has a maximum speed of 150 m.p.h. and a flight radius of 800 miles.

Imperial Airways, in addition to the Handley Page air liner *Horatius*, which arrived from London, also presented the *Athena*, the Armstrong Whitworth four-engine passenger transport plane, *Atalanta* type, equipped with 350-h.p. Armstrong-Siddeley "Double Mongoose" radial air-cooled engines. The two-engined "Gipsy Major" (135 h.p. each) de Havilland "Dragon" of the Hillmans Airways Co. completed the list of British planes. The Luft Hansa Co. presented a Junkers, type G.31, a low-wing cantilever 12-passenger monoplane, equipped with three Pratt & Whitney 525-h.p. "Hornet" air-cooled engines, manufactured under licence by the BMW, of Munich; maximum speed, 133 m.p.h.

An interesting "exhibit" was a Caudron three-seater tourist biplane, type "Phalene," equipped with a 150-h.p. Hispano-Suisa air-cooled engine, in which Rene Lefevre will shortly set out for Madagascar. He plans to fly from Marseilles to Tunis and then to Cairo. From there he will follow the Imperial Airways' Cairo to Cape route to Dar-es-Salaam, and then to Mozambique and Tananarive to Madagascar. Lefevre plans to fly alone, the additional passenger space in the plane being occupied by fuel tanks and baggage. The plane has a maximum speed, thus equipped, of 115 m.p.h. and a flight radius of 1,125 miles.

The other planes presented were of the well-known French types, most of which are in service on the air lines.

R. C. W.

THREE BRITISH REPRESENTATIVES: Imperial Airways' Armstrong-Whitworth *Athena* (top) and Handley Page *Horatius* (centre). Below, the D.H. "Dragon" of Hillmans Airways.

THE ENGLAND—AUSTRALIA AIR SERVICE

LINKING up England and Australia by air is brought one step nearer by the agreement which the British Government is about to conclude with Imperial Airways, Ltd., for the establishment of a weekly service in each direction between Karachi and Singapore. The text of the note by the Secretary of State for Air on the proposed agreement was issued as a Command Paper (No. 4315) on May 9, and reads as follows:—

Karachi-Singapore Air Transport Agreement

The agreement which it is proposed to conclude with Imperial Airways, Ltd., provides for the establishment of a regular weekly air service, in each direction, between Karachi and Singapore, via Calcutta and Rangoon, connecting at Karachi with the existing London-Karachi service (see Cmd. 3143 of 1928), and at Singapore with an Australian service between Singapore and Australia. Taken in conjunction with those services it will constitute a regular weekly service, in each direction, between London and the principal cities of Australia, with extension by steamer to New Zealand.

The agreement is to run for a period of approximately five years, commencing from the date of the opening of the Australian section between Singapore and Australia, and terminating on March 31, 1939, the date on which the existing agreement for the England-India service expires.

In accordance with the terms of an agreement between His Majesty's Government in the United Kingdom and the Government of India, the service between Karachi and Singapore will be operated jointly by Imperial Airways, Ltd., and an Indian company.

The maximum subsidies payable in respect of the Karachi-Singapore service, if the regular weekly service is maintained, will be on the following decreasing scale:—For 1st year of the through service to Australia, £40,000 per annum; for 2nd and 3rd years of the through service to Australia, £30,000 per annum; for the remaining period of the contract, £20,000 per annum.

These maxima are allocated in definite proportions to various sections of the route.

The Governments of India, the Straits Settlements and the Malay States, have undertaken to bear the cost of providing and maintaining landing grounds and other ground facilities, such as wireless and meteorological.

As regards mails, the agreement provides that the rates to be paid shall be arranged between H.M. Postmaster-General in the United Kingdom and the Company. For the through mails between England and Australia (and New Zealand), Imperial Airways and the Indian Company referred to above will receive 24s. sterling per lb. and Australia 16s. sterling per lb., while for mails between England and Singapore the rate will be 30s. per lb. This will enable the Postmaster-General to fix the inclusive charges to the public per ½ oz. letter at 1s. between England and Singapore, and 1s. 3d. between England and Australia (and New Zealand).

In other respects the agreement is, in principle, similar to those of March 9, 1929, for the England-India Service

(Cmd. 3143 of 1928) and of October 22, 1930, for the Egypt-South Africa Service (Cmd. 3696 of 1930).

As for various reasons a simultaneous inauguration of the extension service to Singapore and of the new Australian service connecting Singapore with Port Darwin and the chief cities of Australia is not immediately practicable, it is proposed to bring an interim service into operation as soon as possible in extension of the present weekly London-Karachi service. This interim service will, in the first instance, be from Karachi to Calcutta, but will be extended later to Singapore. Special terms will be arranged for this interim service outside the main agreement.

It is intended that the extension to Singapore, for which the Government of the United Kingdom is responsible, shall take place by stages. At the outset the air journey to Singapore will be made in ten days, thus effecting a saving of from 10 to 14 days as compared with the steamship service from England. A corresponding acceleration of travelling facilities to intermediate stopping places will also be achieved.

In the first instance it is hoped that Imperial Airways will, in conjunction with the Indian company referred to, inaugurate an extended service to Calcutta in July. According to present plans, the service will be further extended to Rangoon about the beginning of October and the complete extension to Singapore should be in operation by or before the New Year.

It has been agreed with H.M. Government in Australia that the section between Singapore and the terminal station in Australia should be operated by a company promoted in Australia and subsidised by the Commonwealth Government.

The Commonwealth Government has taken active steps to complete the air link to Australia at the earliest possible date, and tenders to operate the Singapore-Australia section are about to be called for. Before this service can be established the successful tendering company will have to obtain the necessary complement of aircraft and to set up, in conjunction with the Government, the ground organisation. It is confidently expected, however, that this part of the route will be in operation, at latest, by the end of the financial year.

The Indian company referred to in paragraph 3 of the Command Paper will be called "Indian Transcontinental Airways, Ltd.," and its capital will be subscribed jointly by the Government of India, Imperial Airways, Ltd., and Indian National Airways, Ltd. Arrangements have been made whereby continuity and uniformity of policy and direction will be maintained in respect of the Trunk Service across India.

Indian National Airways, Ltd., is being established for the operation of feeder and other services in Northern India, and plans for operating certain of these services are already in preparation by the Government of India.

For the section between Karachi and Singapore, Imperial Airways and Indian Transcontinental Airways will each provide one-half of the fleet required for the service. The fleets of these two operating companies will be homogeneous and of modern type, carrying passengers and freight as well as mails. They will probably be "Atalanta" type aircraft.

As large a proportion as reasonably possible of the personnel employed by Indian Transcontinental Airways will be Indian, and this proportion will be progressively increased as circumstances permit. Imperial Airways will arrange for the early training of a limited number of Indians in their commercial and engineering departments.

The arrangements for the joint working of the Karachi-Singapore service will continue until March 31, 1939, the date on which the existing agreement between H.M. Government in the United Kingdom and Imperial Airways for the England-India service expires.

Flying Trips to Switzerland

BREAKFASTING in London in the morning one will be able to dine that same evening in Switzerland, thanks to the summer air service every weekday between London, Basle and Zürich, which Imperial Airways brought into operation on May 1. Leaving Croydon airport at 9 a.m., passengers reach Basle at 2.30 p.m. and Zürich at 4 p.m. Swiss train connections, fitting in with the airway timetables, enable various other resorts to be reached in a few hours, while rapid air connections are also available with Italy and Austria. The service from Switzerland to London is timed to leave Zürich at 2.15 p.m. and Basle at 3.30 p.m., the London airport being reached at 9 p.m. Beginning on June 1 there will be an earlier departure from London for Switzerland at 8.15 a.m., reaching Basle at 1.45 p.m. and Zürich at 3 p.m., while in the reverse direction the service will leave Zürich at 3.30 p.m. and Basle at 4.45 p.m., the London airport being reached at 10.15 p.m. This will mean that high-speed modern tourists will be able, if they wish to do so, to fly over from London to Switzerland in the morning, spend several hours there, and be back again in London that same night. Great popularity has already been attained, on this Swiss air route, by conducted flying trips in which special parties of tourists are accompanied by couriers, in the same way as in escorted tours by land or sea. Last summer more than 1,000 holiday makers flew to Switzerland on such conducted trips, and for this summer plans are being augmented considerably, while the facility of the personally-conducted air trip is being extended also to other resorts on the Continent.

Empire Air Mails Speed-up

FURTHER to our announcement in FLIGHT for April 27 last regarding the African Air Mail Speed-up, the Postmaster-General announces that on and after May 17 the latest time for posting for the South Africa air mail will be extended to 1.30 p.m. on Wednesday at the General Post Office, London. Commencing with the service due to leave Karachi on May 10, the incoming Indian air mail will be accelerated by one day and the mail, which leaves Karachi on Wednesday, will be due to reach London the following Monday. The eastbound air mail will still be due to reach Karachi on Friday. The latest time for posting for the Indian air mail, at present 11.0 a.m. on Saturdays, will be extended to 1.30 p.m. on Saturdays at the General Post Office, London, on and after May 13.

European Air Mails: Summer Times

THE Postmaster-General has issued the following latest times for posting air mail correspondence for European countries in the air mail letter-box outside the G.P.O., as from May 1.

Weekdays.—**5.30 a.m.**—Austria, Denmark, Holland, Hungary, Sweden. **6.30 a.m.**—Austria, Belgium, Czechoslovakia, Germany, Hungary, Norway, Switzerland. **7.15 a.m.**—Danzig, France, Germany, Holland, Italy, Poland, Spain. **10.0 a.m.**—Belgium. **11.0 a.m.**—Denmark, France, Holland, Norway, Spain, Sweden. **12 noon.**—Italy, Switzerland. **4.0 p.m.**—Belgium. **5.0. p.m.**—Holland. **8.0 p.m.**—Austria, Bulgaria, Czechoslovakia, Danzig, Denmark, Estonia, Finland, Germany, Greece, Hungary, Italy, Latvia, Lithuania, Poland, Rumania, Russia, Sweden, Switzerland, Turkey, Yugoslavia.

The time for posting air mail correspondence at the General Post Office, London, for Algeria and Tunis will be 7.15 a.m. on weekdays; for West Africa and South America, via France, 11 a.m. on Saturdays; for North Borneo, Brunei, Sarawak, Dutch East Indies, Siam, Straits Settlements and Malay States, 5 p.m. on Wednesdays; and for South China and French Indo-China 7.15 a.m. on Wednesdays.

A new issue of the Air Mail Leaflet giving full particulars of the services is now available. Copies will be sent to all persons or firms who have applied to be placed on the distribution list. The leaflet will also be obtainable free of charge at any post office.

Floating Airport Sails

THE German ship *Westfalen*, which is to be anchored in mid-South Atlantic to serve as a floating airport, has left Cuxhaven for its destination. (A description of this ship and the new use to which it will be put was given in FLIGHT for February 23, 1933.)

New Soviet Airlines

REGULAR airlines from Kharkov to Rostov-on-Don and from Kharkov to Odessa were opened on May 1. The machines on the Kharkov-Rostov line stop at Kramatorsk and Stalino, the centre of the Donetz coal basin. The machines on the Kharkoov-Odessa line stop at Dniepropetrovsk. A new passenger line from Moscow to Mineralnie Vodi, in the North Caucasus, through Rostov-on-Don, was opened on May 5. All aeroplanes and aerodromes in the Ukraine are preparing for the summer season. Beacons, searchlights and light signals are now being set up for the Kharkov-Moscow line, along which flights are to take place night and day. Many new aerodromes are being built in the Ukraine.

THE FULLY SLOTTED AND FLAPPED AEROPLANE

The Heinkel He.64 Special was demonstrated at Radlett Aerodrome on May 3 by Capt. Cordes of the Handley Page Co. In this machine the lift slots are automatic in action. The Breda 39, described and illustrated later, has its lift slots manually operated. Both machines have slots and flaps extending over the whole wing span

AT the demonstration of the Heinkel He.64 Special at the Handley Page aerodrome at Radlett on May 3 the fates were none too kind to the demonstrators. To begin with, there was not a breath of wind, so that no assistance in showing slow landings or slow flying was to be obtained in that way. Secondly, the sky was completely overcast and the cloud layer was at very low altitude, thereby preventing Capt. Cordes from doing some of the long steep descents which had been planned. And finally the wheel brakes had been put out of commission so that even after a steep landing at low forward speed the machine ran a considerable distance, which was unfortunate, as one associates quite unconsciously the length of run with the actual approach and touch down, even when trying to make allowance. In spite of these handicaps, however, Cordes succeeded in giving a very convincing proof of the effectiveness of the fully slotted and flapped wing in comparison with the wing which has automatic wing-tip slots only. The He.64, it will be remembered from our brief notes in last week's issue, has two sets of slots, each with its associated trailing edge flaps. The outer slots function in the orthodox way as automatic lateral stability slots, while the inner slots are lift slots pure and simple. When the lift slot opens, it pulls down its associated trailing edge flap to a pronounced angle. The automatic slot, on the other hand, pulls down its aileron flap a few degrees only, leaving a considerable margin of further, manually-operated, movement for its function as an aileron. The lift slot can be locked in the closed position by the pilot. The wing-tip slot is always free to act automatically. Thus, when the lift slot is held closed, the machine becomes in effect a normal monoplane fitted with automatic wing-tip slots.

The demonstration programme was introduced by Mr. Handley Page, compered by Sqd. Ldr. Tom England, and executed by Capt. Cordes, the chief test pilot of the firm.

The first demonstration took the form of a take-off and a landing with the lift slots locked. In the take-off it was noticeable that the machine seemed to require full throttle to get moving, and elevator fully down to get the tail up, which latter manœuvre seemed to take quite a considerable run. Doubtless this is due to the tall undercarriage which has been fitted for this special machine, which increases the ground angle to about 13 deg. and throws a considerable load on the tail skid by bringing the c.g. well behind the points of wheel contact with the ground. In the take-off run it was well shown that Cordes was not "faking" in order to make the run required appear as long as possible. In fact, he dropped his tail during the run, but the machine would not rise, and the tail had to be brought up again and the run continued before the machine would "unstick." When it came to landing, the He.64 "floated" at low height over the ground for a long time before sinking, and required the best part of the available aerodrome before coming to a standstill without the use of wheel brakes.

The next demonstration was a repetition of the first, but the lift slot was unlocked and permitted to open as soon as the requisite angle of incidence was reached. The run was markedly shorter than before, although Cordes dropped his tail rather too early, and would have got off quicker if he had waited another 50 yd. or so. The landing was very much steeper than with lift slots closed, and the subsequent unbraked run much shorter. The actual distances in the demonstration were not measured, but the Handley Page firm gave out the following figures:—Landing run without lift slots, 356 ft.; with lift slots, 180 ft. Take-off run without lift slots, 580 ft.; with lift slots, 300 ft. Gliding angle without lift slots, 6 deg.; with lift slots, 14.7 deg.

Other demonstrations during the afternoon included stalled descents with and without lift slots. Flying at minimum speed with lift slots closed and open; and various methods of approach with and without the lift slots. The fact that, in very rough-and-ready figures, the lift is multiplied by two and the drag by three when the lift slots are open means, of course, that a steep approach can be made at fairly low speed in straight flight with slots open, when to attain a comparable angle of approach in the unslotted machine, side-slipping, S-turns, etc., have to be resorted to.

The maximum speed appears unaffected, and is given by the Handley Page Company as 146 m.p.h. when the machine is fitted with the "Gipsy III" engine. With the lift slots closed, the minimum speed is given as 60 m.p.h. and with lift slots open as 39 m.p.h. The gross weight is 1,783 lb., and as the wing area is 155 sq. ft., the wing loading is 11.5 lb./sq. ft. The minimum speed of 60 m.p.h. with slots closed corresponds to a maximum k^L of 0.627, and the minimum speed of 39 m.p.h. with lift

AT 39 M.P.H.: Capt. Cordes flying the Heinkel He.64 Special past the spectators. The machine is not, as might appear, about to take Mr. Handley Page's hat off. (FLIGHT *Photo.*)

A STALL LANDING : Capt. Cordes touching down after a steep descent. (FLIGHT *Photo.*)

slots open gives a $k_{L_{max}}$ of 1.484, both in British "absolute" units. In other words, the lift slots more than double the maximum lift.

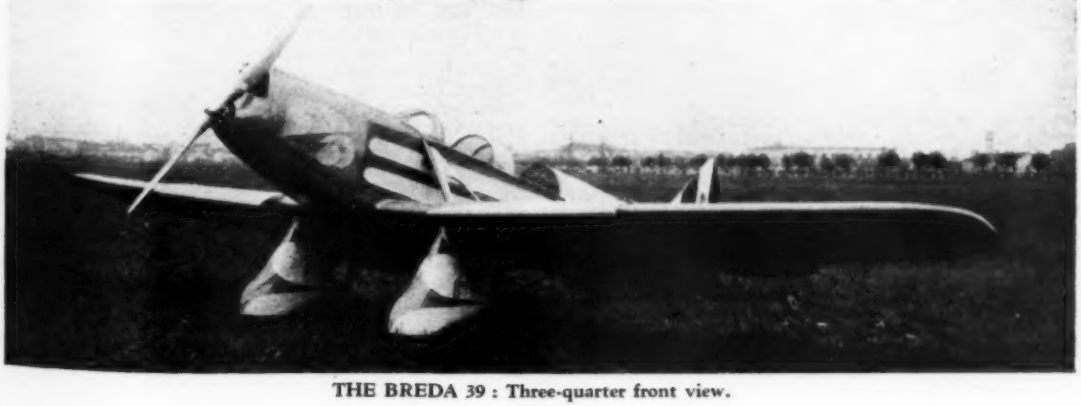
It is difficult to assess how much of the demonstration was due to the undoubted skill of Capt. Cordes and how much to the machine itself. One would like to see the He.64 flown by a pilot of medium skill. One slightly disquieting feature was observed. After the machine had been flying at its lowest speed near the ground, and Cordes opened his throttle to accelerate and get away, the tail was seen to come up, as it normally would. But this had the effect of closing the lift slots (slot operation being based on angle and not on speed), and the machine sank appreciably until the acceleration was sufficient to restore the lift. If this happened to a not-very-good pilot near the ground, the machine might touch. It is at least a debatable point whether manually-operated lift slots, as fitted in the Breda 39 described hereafter, is not a better solution, in spite of the fact that they give the pilot yet another control to work. With the lift slots locked open, the action of bringing the tail up would, at least, not cause the slots to close and the machine to sink.

THE BREDA TYPE 39

130–140 h.p. Colombo S. 63 Engine

SIMILAR in many ways to the Breda 33 flown by Miss Winifred Spooner in the International Touring Competition last year, the Breda 39 is fitted with the six-cylinder "Colombo S.63" engine of 130-140 b.h.p. Presumably any features which could be thought to have contributed to the wing failures which occurred in the 33 have been eliminated in the 39. Like the 33, it is a braced low-wing monoplane two-seater of mixed construction. The fuselage is a welded steel tube structure, while the wing has wood spars and ribs, and is fabric covered. The wing bracing is, like that of the 33, unusual in that wires as well as struts are used. Inverted vee struts run from the top longeron of the fuselage to the plane of the wings containing the undercarriage. The wire bracing runs, on top of the wing, from the same points on the top longeron to points farther out on the wing. Below the wing the bracing wires run to the undercarriage, and again between the two halves of the undercarriage. The angles made with the spars by lift and anti-lift wires are small, and the resulting compression loads in the spars must be considerable.

Pilot and passenger are seated in tandem, under transparent sliding-roof windows. The undercarriage is of the divided type, each unit being complete in itself except for its wire bracing laterally. Large "spats" enclose the wheels almost entirely, and the telescopic legs inside them



THE BREDA 39 : Three-quarter front view.

are of the Vickers oleo-pneumatic type. The wheels are Dunlop low-pressure, with Bendix brakes. The stroke of the telescopic leg is approximately 1 ft., and stall landings can be made at a sinking velocity of 16 ft./sec.

The Alfa Romeo "Colombo S.63" engine is a six-cylinder in-line air-cooled, and is rated at 130-140 b.h.p. It drives an adjustable pitch metal airscrew.

The data given in our table indicate that structurally the Breda 39 is of average efficiency in that the ratio of maximum gross weight to tare weight is 1.67. The machine carries as disposable load 67 per cent. of its own weight. The aerodynamic efficiency as indicated by the Everling "High-speed Figure" $\frac{\eta}{2k_D}$ is high at a value of 23.55.

In the Breda 39 the same arrangement of automatic and lift slots is used as in the Handley Page Heinkel He.64 Special. The lift slots, however, are manually operated, and can be locked in the closed or open position. Presumably also in an intermediate position should this be desired.

It is claimed that the Breda 39 can land over an obstacle 26 ft. high and pull up 100 yd. from the obstacle. In an ordinary landing the run is but 30-40 yd. (presumably using the wheel brakes).

LIFT SLOTS OPEN: This photograph also indicates the bracing on top of the wing.

BREDA TYPE 39
Colombo S. 63 Engine

Dimensions

	ft.	in.	m.
Length o.a.	24	5	7,45
Height	9	8	2,95
Wing span	34	1	10,40
Wing area	188·5 sq. ft. (17,5 m.²).		

Weights

	lb.	kg.
Tare weight	1,232	560
Normal disposable load	617	280
Max. disposable load	826	375
Normal gross weight	1,849	840
Max. gross weight	2,058	935
Normal wing loading	9·8 lb./sq. ft. (48 kg./m.²).	
Max. wing loading	10·9 lb./sq. ft. (53,4 kg./m.²).	
Normal power loading	13·2 lb./h.p. (6 kg./C.V.).	
Max. power loading	14·7 lb./h.p. (6,68 kg./C.V.).	

Performance

Maximum speed	137 m.p.h. (220 km./h.).
Cruising speed	124 m.p.h. (200 km./h.).
Minimum speed	40 m.p.h. (64 km./h.).
Climb to 13,000 ft. (4 000 m.) in 21 minutes.	
Service ceiling	19,700 ft. (6 000 m.).

These performance figures relate to the machine carrying a disposable load of 617 lb., *i.e.*, at a gross weight of 1,849 lb.

Airport News

From Heston

THE Airwork School has had a busy week and flying hours are still increasing both by day and night. Number of new pupils, 4. It is interesting to note that the total sales of petrol at Heston during April were 75 per cent. higher than those of April, 1932, a sure indication of the increase of flying in general. Birkett Air Services have bought Mrs. Mollison's "Puss Moth" G-ACAB from Henlys, Ltd. This is their second record-breaking aircraft, as they already own G-ABKG with which Mr. J. Mollison held the previous record to the Cape. Mr. Digby, who was a pilot on the Western Australian Airways, has joined the firm.

Mizr-Airwork S.A.E.

THE first annual general meeting was held on May 10 in Egypt. Mr. J. Shand, a director of Mizr-Airwork S.A.E., represented Airwork, Ltd., at the meeting. The results for the first seven months ending September, 1932, are extremely satisfactory, the company showing a small profit. The company has ordered two de Havilland "Dragons," which will be delivered early in June. Capt. Spooner, the chief pilot, is returning to England in order to fly one out; the other will be flown out by Mr. B. W. Figgins, who has just joined the company. Mr. C. A. Hedger, who has been chief ground engineer at Heston since its inception, is leaving for Egypt immediately to join Mizr-Airwork for about a year, and Mr. Pierce, another member of the Heston Service Staff, will fly out in one of the "Dragons."

A New Czechoslovak Air Engine

SUCCESSFUL tests have been made of a new air engine turned out by the Walter Works of Jinonice, near Prague. The engine, which is expressly designed for amateur machines, is air-cooled, attains a minimum of 70 h.p. in 2,700 revolutions, and has no greater weight than 70 kilograms. It has received the name of "Walter-Polaris II," and is designed to secure maximum performance consistent with low weight and small cylinder capacity. Vibration, which is one of the main defects of small engines, has been largely eliminated, and the "Walter-Polaris II," in the course of a 52-hr. uninterrupted test running, showed no defect whatsoever. It is proposed to instal this engine in the small sport aeroplanes which will, it is anticipated, give further encouragement to amateur aviation in Czechoslovakia.

Galway Municipal Aerodrome

THE Irish Free State Minister for Defence has informed the Galway Urban District Council that he will lease them the old military aerodrome at Oranmore, six miles east of Galway, for use as a flying field for a period of twenty-one years, subject to the right of the Free State Army Air Corps to use the field at any time. The Minister for Defence (Mr. Frank Aiken) has also made it a condition of the lease that the Council shall erect a hangar at Oranmore. At a meeting of the Council held last week it was decided to complete the lease immediately and proceed with the erection of the hangar. Galway is the first municipality in the Irish Free State to operate an aerodrome, and the rent they are to be charged by the Department of Defence will be £26 per year. Oranmore has been used as a landing field on a number of occasions by civil pilots, and was originally one of the Royal Flying Corps aerodromes in Ireland, before the signing of the Anglo-Irish treaty. It is now anticipated that application will be made by other municipalities in Ireland to take over military aerodromes not in regular use.

Airisms from the Four Winds

Another South Atlantic Flight

THE Polish airman, Capt. Skarzynski, who left Warsaw on April 27 for Brazil, has succeeded in accomplishing a fine crossing from St. Louis, Senegal, to Brazil. Flying a Polish R.W.D.5 ("Gipsy Major"), and using K.L.G. plugs and Shell fuel and oil, he left St. Louis on May 7 at 11 p.m., and flew over Port Natal at 4.30 p.m. next afternoon, landing later at Maceio, some 208 miles further on. His crossing, roughly 17½ hr., was accomplished a few minutes less than the time taken by Mr. J. A. Mollison.

The Autogiro Accident

M. LOUIS DUC was killed near Herbault, France, on May 6, when he crashed in a rotating wing aircraft. Details are not available at present, but it has been reported that part of the covering of one of the rotor blades became detached. Upon making enquiries from the Cierva Autogiro Co., Ltd., we are informed that the firm has no knowledge of the circumstances relating to the accident, and can take no responsibility for the machine itself, as it was designed and built without their knowledge and co-operation.

Aerobatic Competition

THE ROYAL AERO CLUB has been notified that the Aero Club du Rhone is organising an International Meeting at Lyon on June 17 and 18, 1933. The programme includes an aerobatic competition, for which prizes amounting to £400 are offered. Entries will be received at the Aero Club de France, 6, Rue Galilee, Paris, France, up to May 20, 1933. The entrance fee is 1,000 francs, and will be refunded to the competitor on taking part.

Record Hospitality

THE JUNIOR AERO CLUB is, as a mark of its esteem and appreciation, dining Sqd. Ldr. Gayford and Flt. Lt. Nicholetts on Tuesday, May 16, at 8 p.m., in the premises of the Ham Bone Club. The Chairman for the occasion will be Maj. R. H. S. Mealing, of the Air Ministry. Tickets should be applied for as soon as possible to the Secretary, at the Club, in Great Windmill Street.

Benefits of Retraction

RETRACTABLE undercarriages are becoming popular, even in this country, where every designer is proverbially conservative and generally follows the, perhaps wise, procedure of letting others do the experimentation before he himself starts on anything really revolutionary. The latest company to fit this form of "drag-saving" apparatus to their standard aircraft is the General Aircraft Co., Ltd., of Croydon. Their "Monospar" (2 Popjoys) will appear in about three weeks with an undercarriage which can be completely withdrawn, leaving the underside of the fuselage and wings clean and "drag-free." This modification will only entail an increase of some 20 lb. in weight, but will provide a very appreciable increase in performance to offset this. The cruising speed, at 2,950 engine r.p.m., is expected to be 125 m.p.h., with an equivalent increase in climb, and more particularly, range at normal fuel tankage. The undercarriage will be of the "broken-leg" type, locking itself when over the dead-centre. It will be mechanically operated by levers, and will be capable of being retracted or extended very quickly. Already orders have been received for four machines with this latest improvement.

New Soviet Dirigible

THE first semi-rigid dirigible to be built in the Soviet Union—the B-5—has recently been completed. It is an experimental airship, designed to carry four persons. It is of 2,100 cm. and is fitted with a 75 h.p. motor. It is made entirely of Soviet materials. If it proves a success other semi-rigid airships are to be built of a larger size.

Another "Eastern" Complication

IN the article on "A Successful Seaside Air Service" published in our issue for April 27 last, it was stated that Eastern Air Services operated the Skegness and *Eastern Counties* Aero Club. Unfortunately, our contributor got confused with the titles, for this should have read "Skegness and *East Lincolnshire* Aero Club"—the Eastern Counties Aero Club being, of course, an entirely separate concern. We offer our apologies.

Test Flight of New Soviet Aeroplane

TEST flights of a newly-designed Soviet aeroplane, the XAI-I, were successfully carried out a few weeks ago. The machine attained a speed of 291 k.p.h., at 2,100 revolutions of the engine. The XAI-I was designed by a group of instructors of the Kharkov Aviation Institute. The tests were carried out by the Moscow Aviation Research Institute, with Mr. Tikhomirov as the pilot. The aeroplane is equipped with a newly-designed Soviet motor—M-22. The constructors of the plane are of the opinion that it can attain even a greater speed. The Osoaviakhim—the Society for Air and Chemical Defence—is arranging a long flight with this plane to determine whether the mass production of this type of machine should be embarked upon.

Ascent into Stratosphere by Soviet Scientists

THE two scientists nominated for the ascent into the stratosphere which has been planned for June are Mr. Joffe, the eminent member of the Societ Academy of Science, and Professor Runin. The ascent is to take place in the latter half of June from a central point in the Soviet Union. The engineer in charge of the construction of the balloon VA-I, in which the ascent is to be made, is to make a trial flight with one of his assistants, when they intend to pierce the stratosphere to a height of ten to twelve km. The ascent in which the scientists are to take part will penetrate the stratosphere to a height of 22,000 metres. The balloon VA-I differs in many respects from that used by Professor Piccard. The gondola will be enclosed in a network by which it will be suspended from the balloon. The envelope of the VA-I will be filled with 20,000 cubic metres of hydrogen. Experiments are being made to determine the effect of ultra-violet rays and "gamma" rays on the envelope. The composition of the paint for the gondola and the plate glass for the windows is being investigated. It is intended to install glass which, while not bursting from the pressure from inside in the rarified air of the stratosphere, will not accumulate frost and hinder observation.

Airman's Body Found in North Sea

THE body of the Norwegian airman, Mr. Wilhelm Olmsted, who left Heston on January 21 for Oslo, has been found in the North Sea by the trawler *Pelican*.

THE NEW BRITISH AIRCRAFT MARK: This has been established to distinguish aircraft of British construction and which possess a British Certificate of Airworthiness. Constructors and owners must make application to the Air Ministry on C.A. form 89, and when authorisation has been given two transfers will be sent free. Additional transfers will be charged at 5s. each. Authorisations will only be dealt with at the time of issue of an original C. of A., or at the time of renewal of a C. of A.

AIR DISPLAY FOR AFRICAN CHIEF : The Emir of Katsina, his young grandsons and retinue, inspecting the R.A.F. machines which gave a special display in their honour at North Weald Aerodrome on May 4. The Emir, who rules 700,000 people and 800,000 square miles of territory in Northern Nigeria, afterwards flew to Croydon.

The Emir of Katsina

THE EMIR OF KATSINA, from Northern Nigeria, who is on a visit to England as the guest of the British Government, paid a visit to the R.A.F. station at North Weald on Thursday, May 4. The Emir was accompanied by his two sons, Lamba and Nagoge, his brother Kankiya, Malam Salo, one of his advisers, and two small grandsons, Ibrahim and Ussiman. Accompanying the party was Mr. H. S. Goldsmith, at one time Lt. Governor of the Northern Provinces of Nigeria, and Mr. G. S. Brown, the Secretary of the same Provinces, who acted as interpreters. The party motored down from London and were met at the R.A.F. station by Group Capt. G. I. Carmichael, representing Air Vice-Marshal F. W. Bowhill, Air Officer Commanding Fighting Area, and Wing Com. R. H. G. Neville, who commands the station. The Emir then watched a display staged by the squadron. No. 56 (Fighter) Squadron took off and flew round in formation, diving low past the spectators. The party then proceeded to the butts and witnessed an exhibition of machine-gun firing through a propeller. Three Bristol "Bulldogs" of No. 29 (Fighter) Squadron next took off and attacked No. 56 Squadron in the air. The rest of No. 29 Squadron was drawn up on the ground and the Emir and his party inspected them, being shown the workings of the controls and the method of attaching bombs on to the racks. A Vickers "Virginia" then rose into the air and gave a display of supply dropping by parachute. A similar performance was given by a Hawker "Hart" of No. 33 Bomber Squadron.

The Emir and his suite eventually left North Weald in a Vickers "Virginia" and flew to Croydon, where they were shown round the airport, inspecting a 42-passenger machine of Imperial Airways. This is by no means the first experience the Emir has had of aircraft. He has in the past shown great courtesy to Service machines which have visited Katsina from time to time, and so the British Government are but returning the hospitality which he has shown to their representatives.

A STEAM-DRIVEN AEROPLANE : Successful tests were recently carried out at Oakland, Calif., with an aeroplane equipped with a steam engine, the invention of William J. Besler and George Besler, shown on the right beside their power plant installed in the machine, seen on the left. Details are not at present available, but it would seem that the steam generator is of the "flash" type with oil burner, and the engine has two cylinders—probably double acting. In any case, as will be seen from our illustrations, the entire plant is undoubtedly compact and simple.

THE AQUATIC SIDE OF A.S.T. : A Saro " Cutty Sark " Amphibian and a 23-ft. Power Aircraft Service Tender.

FRESH DEVELOPMENTS AT AIR SERVICE TRAINING, LTD.

AIR SERVICE TRAINING, LTD., has acquired, since its opening in 1931, the reputation of being one of the leading aeronautical training centres of the British Empire, or for that matter, of the world. The period has been one of continued success and development. The upper illustration on this page illustrates one of the latest aspects of the training given at the school. It depicts one of the two *Cutty Sark* amphibians fitted with 7-cylinder " Genet Major " engines which have been recently acquired by the school. The inclusion of these machines in the fleet of training aircraft should make a particular appeal to the serious student—wisely anticipating flying-boat development—as on them he can also obtain first-class navigational experience and training in seamanship. The hourly rate for these machines is very reasonable and their possession by A.S.T. constitutes a unique asset.

Seaplane training is carried out on the Avro " Tutor," " Avian " and " 504 K." An important adjunct to this phase of training and one which amply illustrates the general policy of A.S.T. as regards its equipment is the high-speed " Power " boat, capable of over 30 miles an hour, also shown in the illustration. " Power " boats are standard equipment for R.A.F. coastal stations and Imperial Airways. This company was also responsible for the design of the world speed record holder, *Miss England I.*

An Avro VI (three 7-cylinder " Genet Major " engines) has been brought to A.S.T. mainly for the use of pupils on the long courses who expect to take up commercial work on the heavy air lines. It will, of course, be available for all classes of pupils, and as it is fitted with blind flying instruments it should increase the popularity of the A.S.T. Blind Flying Course with commercial pilots.

The number of aircraft available for training purposes has also been increased by the arrival of five Avro " Cadets." This unique fleet of aircraft now consists of 25 machines and of no fewer than nine different types.

A fresh block of quarters has had to be opened for the accommodation of new pupils, and these are, as are all the quarters at A.S.T., very comfortably furnished. Each pupil's room is fitted with a constant hot and cold water supply and central heating. The accommodation and messing arrangements generally are similar to those provided for officers of the R.A.F.

Pupils who have joined the school during this month have been Sir Pyers Mostyn (Kenya Colony) for blind flying, Señor Manuel Pardo (Peru) for advanced flying, Mr. Hendrikz (South Africa) and Mr. Murray for the instructor's course.

LOOKING DOWN ON THE FLEET : An aerial view of some of the A.S.T. aircraft at Hamble. (FLIGHT *Photo.*)

Correspondence

The Editor does not hold himself responsible for opinions expressed by correspondents. The names and addresses of the writers, not necessarily for publication, must in all cases accompany letters intended for insertion in these columns.

A SLIDE VALVE FOR TWO-STROKES

[2851] Referring to the diagrammatic representation and description of my sliding valve two-stroke engine, in your issue of March 23, 1933, you mentioned the heavy fuel consumption of the two-stroke engines. My opposed cylinder model fitted with a 3-ft. airscrew will run for 18 min. on one pint of petrol at a speed of 1,440 r.p.m.

A radial or any other type of engine fitted with my valves can be supercharged by transferring air from under the pistons to scavenge the cylinders and forcing the explosive mixture through a valve into the cylinder by a compressor, just as the exhaust ports are closing. A supercharged radial engine worked on my method would not require any gear wheels in the whole engine if coil ignition is used.

I should be pleased to show my engine working to any firm interested.

W. E. DOPSON.

East Sheen, S.W.14.
April 24, 1933.

P.S.—My motor cycle does 120 m.p.g.

"ELEKTRON"

[2852] Already several times we have found that constructors and users of elektron have got a wrong impression of the information given by Mr. Plesman in his lecture for the Royal Aeronautical Society on February 2, *re* the construction of chairs made of elektron for the Amsterdam-Batavia service and the results obtained with same.

In order to avoid misunderstandings as regards our opinion about the suitability of elektron as a material for aircraft construction, Mr. Plesman would like to state that this material has very definite advantages owing to its lightness relative to strength and actually different parts of the aeroplanes in use with our company, such as engine cowlings and important constructional details of the undercarriage, wheels and brakes are made of this light alloy, and have given complete satisfaction.

The difficulties with the elektron chairs, mentioned by Mr. Plesman in his lecture, were mainly caused by lack of experience in manufacture, and further by the condition that we wanted to use the material for decorative purpose without any protective paint.

If you could inform your readers about the above given details, Mr. Plesman would appreciate this highly.

pp. Koninklijke Luchtvaart Maatschappij
voor Nederland en Koloniën,
A. PLESMAN.

's Gravenhage,
Hoofdkantoor: Hofweg 9.
April 24, 1933.

THE S.M.1 MONOPLANE

[2853] On page 422 of your issue of May 4 you publish a photograph of the S.M.1 pusher monoplane. At the front of the machine is a group of three, Mr. Shackleton, the writer and our draughtsman, Mr. P. F. Bryan. The latter, whose name is not mentioned by your paper, completed practically all the detail drawings of the machine, and also helped with the detail design. Great credit is due to him for his work, as there were practically no mistakes found in the drawings during manufacture.

It might interest you to know that the writer obtained many of his ideas for this machine during a trip through the United States. As the guest of Mr. James Haizlip, of the Shell Company, St. Louis, he was very kindly received by the Curtiss Wright Company, and had the pleasure of a flight in the Curtiss "Junior." The S.M.1 has many original features, but her general outlines resemble the Curtiss "Junior," and it is only fair to draw attention to this fact.

An even earlier machine of similar general lines was constructed by Wing Com. Wackett in Australia. We understand that this was as early as 1924, and this was probably the pioneer of the type.

LEE MURRAY.

London, W.1.
May 5, 1933.

FLYING BOAT DEVELOPMENT

[2854] We have read, with interest, your Editorial Comment regarding flying-boat development, in the April 27 issue of FLIGHT. We should be grateful, however, for an opportunity of correcting one or two misleading impressions concerning our "Iris" type flying boat which may have been caused by your comment.

In the first place, your comment states that the engines installed in the "Iris" are not of the latest Rolls-Royce type. May we point out in this connection that an "Iris V" flying boat fitted with three Rolls-Royce "Buzzard" II M.S. engines was launched in March, 1932—over 12 months ago—and that since then all the "Iris III" boats in service have been converted to incorporate this installation.

At the present time we are building a number of "Iris VI" flying boats, also fitted with Rolls-Royce "Buzzard" engines.

In a later paragraph of your comment reference is made to figures which give the impression that the "Iris" is incapable of a speed of more than 110 m.p.h. and that a still-air range of 1,000 miles is unusual. As far as speed is concerned, the "Iris III"—first produced in 1929—had a top speed of 120 m.p.h., the "Iris V" top speed is 131 m.p.h., and the top speed of the "Iris VI" is expected to be approximately the same. The range of the "Iris V" is 1,200 sea miles and of the "Iris VI" a range of 1,500 sea miles is expected.

Whilst we appreciate the motive for your comment and support the progressive policy in flying-boat development advocated by FLIGHT, we maintain that, in spite of having kept the same name since the first "Iris" was produced in 1926, the history of this boat shows progressive development of a design which is still considered to be one of the most efficient in this or any other country.

R. BLACKBURN
(The Blackburn Aeroplane & Motor Co., Ltd.).

Brough, Yorks.
April 28, 1933.

AIR DISARMAMENT

[2855] Referring to Mr. Handley Page's views on Air Disarmament, I agree with you, of course, that the products of his brain usually carry very great weight—they have even been known to sink in, sometimes in spite of opposition and sometimes through lack of support.

But when it comes to some of the points dealt with by him and approved by you I am going to have the temerity to differ completely. He uses an expression "confused thinking"—which I am afraid is a term of abuse rather than an argument, but as it is presumably considered a civilised weapon I propose to avail myself of it, and in turn to accuse him (and of course yourself) of a like lapse from mental rectitude. No doubt I shall have to meet the same charge myself, but it is by argument that we clear our thinking.

Now it seems to me that it is complete confusion of thought to talk of a "world conscience" and of "reasonableness" in connection with war at all; for the whole point is that the world in plunging into a war throws reason to the winds and puts might in the saddle; it cannot then talk of conscience and reason.

Similarly with so-called non-combatants; it seems idle to try to maintain that a munition factory manned by "civilians" is on a different footing from a munition dump manned by soldiers. Personally, I should be less inclined to bomb the conscript soldiers than I should the voluntary munition makers working for high pay. After all, *the front line exists to protect both.*

And when it comes to differentiating between ages and sexes I quite fail to see any moral rectitude in singling out the flower of the manhood of the human race for first slaughter; and for the remainder of the populations to then claim immunity as "civilians" seems to me to be the height of moral nerve and physical cowardice.

I do not know whether Mr. Handley Page and FLIGHT aspire to the fashionable name of Realists, but I should

hardly call it realism to draw fine distinctions between combatants and non-combatants in a modern war in which practically the whole adult population is doing all it can to further the war. Nor realism to talk of humanity and reasonableness in connection with a process which from the point of view of mankind is merely anarchy.

Mr. Handley Page seems to be in grave error when he says that "it can be confidently stated that no serious suggestions were ever made during the stress of the Great War that there should be a resort to either of these methods" (poison in water or any other form, as prohibited by the Hague Convention). Has he forgotten the use of gas?

Finally, Mr. Handley Page advances the view that aircraft shortens a war and are therefore good things. In an unequal contest like Jehol that may be so, but it does not follow that it would have the same result if the forces were nearly equal. Besides, is there not a corollary to his theorem? If it is possible for might to get the better of right in a short time will it not be resorted to more frequently? That seems to need no answer.

Personally, I am still inclined to think that the best safeguard for peace provided by the aeroplane is the knowledge that it will bring home to the peoples of the world the realities of war should they be foolish enough to resort to it again. Without the threat of aircraft there seems to be a distinct danger of the minority again being thrust into a shambles by a complacent majority who know not what they do.

W. E. GRAY.

Edgware, Middx.
April 17, 1933.

THE ROYAL AIR FORCE

London Gazette, May 2, 1933

General Duties Branch

Marshal of the Royal Air Force Sir John Maitland Salmond, G.C.B., C.M.G., C.V.O., D.S.O., LL.D., is restored to full pay from half-pay (April 3).

Marshal of the Royal Air Force Sir John Maitland Salmond, G.C.B., C.M.G., C.V.O., D.S.O., LL.D., is appointed to the Air Ministry for special duties and to be an additional (temporary) member of the Air Council (April 3).

The follg. Pilot Officers on probation are confirmed in rank :—R. S. Howe, C. F. M. Rambaut (April 1) ; D. I. Coote (April 8). The follg. Pilot Officers are promoted to rank of Flying Officer (April 11) :—J. W. Donaldson, D. Y. Feeny.

Wing Com. V. Gaskell-Blackburn, D.S.C., A.F.C., is placed on half-pay list, Scale A (April 26) ; F/O. D. R. S. Bader is placed on retired list on account of ill-health (April 30) ; Flt. Lt. J. Harston is transferred to Reserve, Class A (May 1) ; F/O. L. E. A. Wright is transferred to Reserve, Class C (Dec. 30, 1932) (substituted for *Gazette*, Jan. 3).

Stores Branch

The follg. Warrant Officers are granted permanent commns. as Flying Officers on probation with effect from and with seny. of April 20 :—E. A. Howes, M.B.E., A. E. Harbot, M.B.E., H. C. Adams, H. W. C. Springham, F. G. Hammond. F/O. on probation T. E. Guttery, M.B.E., is confirmed in rank (April 19).

Medical Branch

Flt. Lt. J. B. Gregor, M.R.C.S., L.R.C.P., is promoted to rank of Sqdn. Ldr. (April 30) ; Flt. Lt. A. R. French, M.R.C.S., L.R.C.P., is transferred to Reserve, Class D (ii) (May 2) ; Flt. Lt. P. J. Nyhan, M.B., B.Ch., ceases to be employed with the Regular Air Force (May 2) ; Flt. Lt. G. Kinneir, M.R.C.S., L.R.C.P., relinquishes his temp. comm. on completion of service (April 7).

ROYAL AIR FORCE RESERVE
RESERVE OF AIR FORCE OFFICERS

General Duties Branch

S. O. Tudor is granted a commn. as Pilot Officer in Class AA (ii) (May 3) ; A. L. Maidens is granted a commn. as Pilot Officer on probation in Class BB (May 3) ; P/O. A. B. Tucker is promoted to rank of Flying Officer (March 28) ; P/O. H. D. Hinde relinquishes his commn. on completion of service (May 2). The follg. are transferred from Class A to Class C :—Flt. Lt. S. C. O'Grady, M.C. (Feb. 10) ; Flt. Lt. A. R. Bocree, Flt. Lt. A. F. Marlowe, Flying Officer H. B. Elwell (May 1). The follg. Flying Officers are transferred from Class C to Class A :—A. L. T. Naish (April 4) ; R. B. Whittingham (April 5).

SPECIAL RESERVE

General Duties Branch

H. J. Raymond is granted a commn. as Pilot Officer on probation (April 6). The follg. Flying Officers are promoted to rank of Flt. Lt. (Feb. 12) :—J. F. R. Hunter, R. C. Newton. Pilot Officer L. M. Few is promoted to rank of Flying Officer (Jan. 24).

Medical Branch

J. L. H. Easton, M.B., M.R.C.P., M.R.C.S., is granted a commn. as Flying Officer (March 25).

AUXILIARY AIR FORCE

General Duties Branch

No. 604 (*County of Middlesex*) (*Bomber*) *Squadron*.—The follg. Pilot Officers are promoted to rank of Flying Officer :—R. A. Budd (March 22) ; M. D. Doulton (March 29).

No. 605 (*County of Warwick*) (*Bomber*) *Squadron*.—H. M. Goodwin is granted a commn. as Pilot Officer (April 1) ; P/O. W. C. Barnaby is promoted to rank of Flying Officer (Jan. 15).

No. 608 (*North Riding*) (*Bomber*) *Squadron*.—P/O. H. C. Newhouse is promoted to rank of Flying Officer (Jan. 5).

ROYAL AIR FORCE INTELLIGENCE

Appointments.—The following appointments in the Royal Air Force are notified :—

General Duties Branch

Squadron Leader G. G. Dawson, to Station Flight, Andover, 25.4.33, for flying duties, *vice* Sqdn.-Ldr. V. Buxton, O.B.E.

Flight Lieutenants : H. E. E. Weblin, to No. 1 Armament Training Camp, Catfoss, 24.3.33. E. C. Lewis, to H.Q., Aden Command, 9.4.33. H. A. L. Pattison, to Special Duty List whilst employed with Royal Canadian Air Force, 21.4.33. R. L. Ragg, A.F.C., to Station H.Q., Farnborough, 24.4.33.

Flying Officers : F. P. R. Dunworth, to H.Q., Fighting Area, Uxbridge, 24.4.33. A. E. J. Pratt, to Aircraft Depot, India, Karachi, 21.4.33.

Stores Branch

Flight Lieutenant G. H. Doveton, to Special Duty List whilst employed with Royal Canadian Air Force, 21.4.33.

Flying Officers : The undermentioned Flying Officers are Posted to Sch. of Store Accounting and Storekeeping, Cranwell, 20.4.33, on appointment to Permanent Commns. :—H. C. Adams, F. G. Hammond, A. E. Harbot, M.B.E., R. A. Howes, M.B.E., H. W. C. Springham.

Medical Branch

Flying Officer O. S. M. Williams, to No. 47 (B.) Sqdn., Khartoum, Egypt, 25.3.33.

NAVAL APPOINTMENTS

The following appointments have been made by the Admiralty :—

Lieut.-Com. (*Flt.-Lieut., R.A.F.*).—I. R. Grant, to *Victory*, for R.A.F. base, Gosport, for course (February 15) and to *Kent*, for 403 Flt. (March 16).

Lieuts. (*F/Os. R.A.F.*).—T. W. T. Blackwell, to *Glorious*, for 447 Flt. (on relief) ; H. J. F. Lane, to *Furious*, for 801 Sqdn. ; D. H. Elles and D. D. O'Brien, to *Glorious*, for 823 Sqdn. ; and B. J. C. Wise, to *Glorious*, for 812 Sqdn.

ROYAL MARINES

Lieut. (*F/O., R.A.F.*).—A. C. Newson, to *Furious*, for 822 Sqdn.

ROYAL AIR FORCE

Flying Officers.—F. S. Gardiner, to *Eagle*, for 803 Sqdn. (April 26) ; and G. B. S. Coleman, to R.A.F. Base, Gosport (May 1).

R.A.F. Dinner Club

THE 11th Annual Dinner of the R.A.F. Dinner Club will be held at 8.30 p.m., on Friday, June 23, at the Connaught Rooms. Membership of the club is open to all serving R.A.F. Officers and past Officers of the Royal Air Force, Royal Flying Corps or Royal Naval Air Service. Serving Officers of the Royal Navy, Royal Marines, H.M. Army and the Dominion Forces are also eligible for temporary membership, whilst serving with the Royal Air Force. The Honorary Secretary is Squadron-Leader F. R. Wilkins, Air Ministry, Kingsway, W.C.2, from whom particulars and forms of application for membership can be obtained.

Boxing at De Havillands

THE DE HAVILLAND SPORTS CLUB organised an excellent Boxing Display on Friday, May 5. Combatants were invited from the R.A.F., Police Force, and the Army, and they met many expert A.B.A. Open Competition and Novice winners. Several of the contests were in the nature of return bouts after a similar display last year. A large and enthusiastic crowd followed the contests with great keenness. It was perhaps a little unfortunate that in many cases there was an obvious lack of fitness, and the opponents almost fought themselves to a standstill before the last round. This, however, served but to equalise matters, so that on more than one occasion each floored the other for a count of nine before a final decision was obtained. It is difficult at a display like this to single out any one person, but we should like to mention L.AC. Fane, an R.A.F. champion in India in 1929/30, who although he lost both the fights in which he took part during the evening, stood a terrific amount of punishment, and came up smiling at the end. His bouts typified the sporting spirit which pervaded the whole evening.

The Industry

HANGAR ROOFS

AN efficient covering for hangars has in the past caused endless thought. Strength without excessive weight, non-inflammable, non-corrosive, easy of maintenance, and not unduly affected by changing temperatures are qualities needed. Cellactite claim that they have united these principles. Their roofing material is an imperishable compound of high-grade asbestos and asphalte, consolidated by pressure with a steel core, so that the steel is permanently sealed from all corrosive influences, and finished in the form of standard corrugated sheets. The result is strong, light and resilient, yet completely resistant to weather and corrosion. The maintenance cost is very small, and it has been proved by trial to withstand excesses of temperature. Such well-known aeronautical firms as Imperial Airways, Handley-Page, Short Bros., Fairey Aviation, etc., use buildings made of Cellactite, as do also the Air Ministry, Asiatic Petroleum, and Imperial Chemicals. Further particulars regarding this material may be obtained from Cellactite & British Uralite, Ltd., Lincoln House, 296-302, High Holborn, W.C.1.

GOGGLES

GOGGLES have always been to pilots an endless source of worry and responsible for much discomfort, which Messrs. E. B. Meyrowitz, of 1a, Old Bond Street, W.1, have done much to remedy. They have now brought out a new Luxor Kokel goggle which is made with tinted lenses in amber, green and Crook's B tints. The principal feature of this goggle is the light weight of the entire frame and lenses. They will be found extremely beneficial when flying against the sun, and are, of course, protection against wind and dust. They are extremely comfortable round the eyes and do not sit harshly on the nose.

FORGINGS

IN a little booklet, Albion Drop Forgings Co., Ltd., of Foleshill, Coventry, set out clearly and briefly their aims and ambitions. A drop forging of first-class quality at a keen price, with no waste and no guesswork in the making. Forgings for aero engines are constantly being made by this firm and have proved their reliability time and time again. In fact, the quantity of aircraft work done has resulted in much accumulation of knowledge and has been an excellent tonic for improvement and increased reliability.

AN AIRCRAFT EXCHANGE AND MART

TWO ex-R.A.F. officers have opened offices at No. 7, Park Lane, W.1, from whence they will operate the "Aircraft Exchange and Mart." Their main object will be to sell and exchange all types of aircraft and aero engines and also to deal in all classes of aviation instruments and accessories. They are putting into operation a service and maintenance scheme whereby every aircraft purchased through them will be permanently looked after. Hire purchase terms will also be arranged for those who wish to obtain their aircraft in this manner. They propose to deal not only with private and civilian owners in this country, but also Foreign Governments contemplating the purchase of military aircraft.

MORE FLYING CLOTHING

THOSE who are interested in flying clothing should make a point of visiting D. Lewis, Ltd., of 124, Gt. Portland Street, who are at present holding a special display of summer aviation kit. Lewis's have a particularly wide range of khaki or white drill flying helmets and overalls, the latter in most cases being of the useful zip fastener type. There will also be found every possible form of gloves, boots, goggles, etc., that any pilot can want. Readers writing to the company and mentioning FLIGHT will receive a comprehensive folder of leaflets giving full particulars of all the equipment. Also of particular interest is their suède jacket of entirely new design. It has a double front, making it windproof, and is zip fastened at one side. In the front there is a large, convenient pocket with a diagonal opening.

FOR UPHOLSTERY

A VEGETABLE filling for upholstery is the most interesting product of the Mitcham Fibre Mills, Ltd., Grove Mills, Mitcham, Surrey. This is particularly light and therefore suitable for consideration as a stuffing for the upholstery of aircraft. This filling, called *Lyxhayr*, is absolutely odourless and is sterilised during manufacture. No insect can exist in it, and its durability has been proved, particularly its resistance to the attacks of the white ant, by the fact that it is regularly used by the Indian State Railways. It is much lighter than hair and does not, like this latter substance, break up and go to dust. Its light weight is, of course, particularly interesting for aircraft manufacturers, and 22 lb. of *Lyxhayr* are equal in filling capacity to 28 lb. of ordinary hair.

Change of Address

WILL readers please note that the postal address of British Salmson Aero Engines, Ltd., is now "Raynes Park, London, S.W.20," and *not* New Malden, as hitherto.

PUBLICATIONS RECEIVED

Aeronautical Research Committee Reports and Memoranda: No. 1497. *The Influence of Wing Density upon Wing Flutter.* By A. G. Pugsley. June, 1932. Price 1s. net. No. 1499. *Reversal of Aileron Control due to Wing Twist.* By W. J. Duncan and G. A. McMillan. July, 1932. Price 1s. net. No. 1500. *Resistance Derivatives of Flutter Theory.* Part I. By W. J. Duncan and A. R. Collar. Oct., 1932. Price 9d. net. London: H.M. Stationery Office, W.C.2.

U.S. National Advisory Committee Technical Notes: No. 450. *Mercerization of Cotton for Strength with Special Reference to Aircraft Cloth.* By J. B. Wilkie. Feb., 1933. No. 451. *Wind-Tunnel Research Comparing Lateral Control Devices, Particularly at High Angles of Attack: X. Various Control Devices on a Wing with a Fixed Auxiliary Airfoil.* By F. E. Weick and R. W. Noyes. Mar., 1933. No. 452. *The Importance of Auto-Ignition Lag in Knocking.* By E. S. Taylor. Mar., 1933. No. 453. *Experiments with a Counter-Propeller.* By E. P. Lesley. Mar., 1933. No. 454. *The N.A.C.A. Combustion Chamber Gas-Sampling Valve and Some Preliminary Test Results.* By J. A. Spanogle and E. C. Buckley. Mar., 1933. No. 455. *Comparison of Three Methods for Calculating the Compressive Strength of Flat and Slightly Curved Sheet and Stiffener Combinations.* By E. E. Lundquist. Mar., 1933. No. 456. *The Aerodynamic Effect of a Retractable Landing Gear.* By S. J. De France. Mar., 1933. No. 457. *The Aerodynamic Characteristics of Airfoils as Affected by Surface Roughness.* By R. W. Hooker. April, 1933. *Errata for Technical Note No.* 447. *The Effect on Lift, Drag and Spinning Characteristics of Sharp Leading Edges on Airplane Wings.* U.S. National Advisory Committee for Aeronautics, Washington, D.C., U.S.A.

NEW COMPANIES REGISTERED

ROOTES, LTD.—Capital £10,000 in £1 shares. Aviation, automobile, agricultural, marine and general engine-construction and repairing experts, engineering, concessionnaires in connection with aeroplanes, hydroplanes and general aircraft, motor cars, etc. Directors: William E. Rootes and Reginald C. Rootes (life directors). Solicitors: Roney & Co., 42, New Broad Street, E.C.

MESSIER AVIATION ENGINEERING CO., LTD., 19, Grosvenor Place, S.W.1. Capital, £7,000 in £1 shares. Mechanical, constructional and general engineers, aeronautical, motor engineers, etc. Subscribers are:—Geo. E. Heath, 28, Abingdon Court, W.8, director of limited company. Dorothy K. Ambrose, 19, Grosvenor Place, S.W.1, chartered secretary. First directors are to be appointed by the subscribers.

YORK COUNTY AVIATION CLUB, LTD.—A company limited by guarantee without share capital with 20 members each liable for £5 in the event of winding up. Objects, to establish and carry on a club in connection with aviation. Directors:—Horace R. Humpheries, Newsam Green, Woodlesford, Leeds, motor engineer. Arthur Senior, Hayfield, Shadwell, Leeds, insurance broker. Solicitor: D. R. Hayes, 7, Bank Street, Leeds.

BRITISH AND INTERNATIONAL AIR RACES, LTD.—Capital £750 in 1s. shares. The objects are to promote, organise, support, subsidise, control, hold and superintend the holding of aeronautical and aviation meetings and exhibitions, whether at home or abroad, under the rules and regulations of the Federation Aeronautique Internationale, Royal Aero Club of the United Kingdom and other similar bodies. Solicitors: Slaughter & May, 18 Austin Friars, E.C.2.

Change of Name

ROOTES, LTD.—Aviation and automobile experts, etc. Len Engineering Works, Maidstone. Name changed to Rootes Securities, Ltd., on April 19, 1933.

AERONAUTICAL PATENT SPECIFICATIONS

Abbreviations: Cyl. = cylinder; i.c. = internal combustion; m. = motors. (The numbers in brackets are those under which the Specification will be printed and abridged, etc.)

APPLIED FOR IN 1932

Published May 4, 1933

2,986. GENERAL ELECTRIC CO., LTD., J. M. WALDRAM and G. H. WILSON. Beacons for aerial navigation. (390,600.)

4,396. D. NAPIER & SON, LTD., and R. W. VIGERS. Sealing-rings for pistons. (390,610.)

6,533. G. SCHWARZ GES. and H. SUKOHL. Aeronautical propellers. (390,619.)

14,194. MCKAY CO. Glider seating-structures. (390,662.)

15,484. A. WISEMAN, LTD., and A. WISEMAN. Furl-injection devices for i.c. engines of Diesel or compression-ignition type. (390,667.)

15,485. A. WISEMAN, LTD., A. WISEMAN and W. SIMMONS. Fuel-pumps for i.c. engines of Diesel or compression-ignition type. (390,668.)

16,047. A. WISEMAN, LTD., A. WISEMAN, and W. SIMMONS. Fuel-feed pumps for i.c. engines of Diesel or compression-ignition type. (390,672.)

Published May 11, 1933

6,951. BRITISH THOMSON-HOUSTON CO., LTD., H. ORCHARD and A. C. YEATES. Methods of driving superchargers for i.c. engines. (390,935.)

11,620. BRITISH THOMSON-HOUSTON CO., LTD. Echo altimeter apparatus for use on aircraft. (390,956.)

28,117. AKTIESELSKABET DANSK REKYLRIFFEL SYNDIKAT. Trigger-operating devices for the machine guns of aircraft. (391,037.)

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